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THE

INTERNATIONAL SCIENTIFIC SERIES.

VOL. XLVIII.

FALLACIES

A VIEW OF LOGIC FROM THE PRACTICAL SIDE

69784

BY

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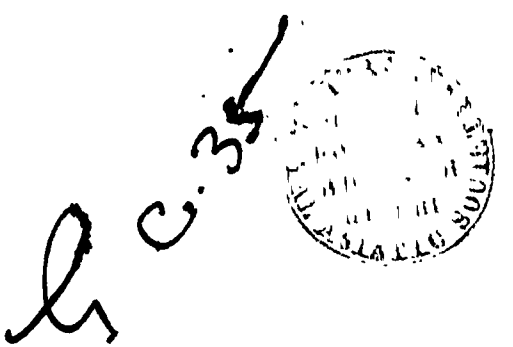

LONDON

KEGAN PAUL, TRENCH & CO., 1, PATERNOSTER SQUARE

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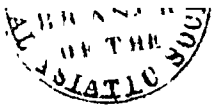

PREFACE.

THIS book is intended, like the others in the *International Scientific Series*, mainly for the general reader. That is to say, it requires no previous technical training, and is written as much as possible from the unprofessional point of view.

Although any treatment of Fallacies must be to a great extent a treatment of methods of Proof, and must therefore demand a certain amount of general logical theory, yet by trying to keep chiefly in view the practical side of the science of Logic,—subordinating to that all other interests or inquiries,—I have been able to neglect the discussion of much debatable matter and to avoid definite adherence to a school. No doubt, Mill and Bain, —and, more remotely, Hume,—are the authors to whom the general substance of the present work is mainly traceable; but one may, I hope, utilise many of their results without being compelled to accept the whole of their Philosophy. As regards later writers, although

hints have here and there been taken from various other sources, English and German, the aid so obtained has been, I think (except where expressly mentioned), fragmentary or indirect.

It is impossible fully to acknowledge all the *vivâ voce* help received from friends, but I may at least here express my gratitude to the anonymous Founder of the Berkeley Fellowships at the Owens College. The election to one of these, in 1881, has given me the opportunity of finishing this book (then already designed for this Series): and has also provided me with the invaluable advice and criticism of Prof. Adamson.

By the courtesy of the Editor of *Mind*, a portion of chapters iii. and iv. (Part I.) is reprinted from that Journal.

MANCHESTER, *May*, 1883.

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FALLACIES.

INTRODUCTION.

I. Difficulties of Treatment.

Logic holds what may well be called an uncomfortable position among the sciences. According to some authorities it cannot be properly said that a body of accepted logical doctrines exists: according to others, the facts and laws that form such doctrine are so completely undeniable that to state them is hardly to convey new or important information. Hence, if a writer on the science tries to avoid truism, and so to give practical importance to his statements, there is danger both of real but crude innovation, and also of over-simple belief in the value of merely verbal alterations. Moreover, at its best, Logic has many persistent enemies, and by no means all of them are in the wrong: so that those who view the science as the thief or burglar views the law, find themselves apparently supported and kept in countenance by others who really have the right to view

it as perhaps the artist views the rules that hamper genius. Through its deep connexion with Common Sense, Logic is often a source of exasperation to Philosophy proper: while Common Sense on the other hand is apt to dread or dislike it as unpractical or over-fond of casuistical refinements. Failing thus to win a steady footing, it turns, sometimes, to Physical Science for a field of operations: but Physical Science has its proper share of boldness, and often leaves the cautious reasoner behind. As for Art,—which finds even Common Sense too rigid,—here Logic is liable to meet with opposition at every grade; from the righteous impatience of poetic souls that are genuinely under grace, down to the incoherent anger of mere boastful vagueness, or to the outcry of the sentimental idler.

In the midst of these perplexities, it is difficult to choose a quite satisfactory course. Some excuses may, however, be offered for the line that has here been taken; and, first, I would plead as against the charge of irregularity or presumption the fact that I have wished to keep a single purpose in view, avoiding all questions that fail to bear directly upon it. Usually, in works on Logic, the object has been to say something valuable upon all the questions traditionally treated as within the field of the science, and, in attempting this, the single practical purpose is apt to become obscured. It is only in consequence of my avoidance of side-issues that any appearance of novelty in the treatment has followed. Moreover, it is not teaching, but suggestion that is chiefly

here intended. It is always allowable to write rather in the co-operative spirit than the didactic, and this has certainly been my aim throughout. And the same apology may apply to the charge of forcing verbal changes upon the reader: the novelties of statement are here put forward merely as possible aids in keeping our single purpose clear, and, in fact, I found them almost unavoidable.

As regards the points where Logic might seem to clash with the furthest or deepest Philosophy attainable, the plan adopted has been to avoid all controversy by restricting our discussion to the questions that arise before such deepest Philosophy begins. Without advancing any opinion on the merits of metaphysical inquiry in general, or on any of its particular results, I wish to confine attention to a totally different set of problems.

As regards Physical Science, it must be confessed that Logic merely follows after it, systematising methods already adopted there, and found to lead to good results. And I hold that to combat Fallacy is the *raison d'être* of Logic; and that Science, though not infallible, is more free from discoverable fallacies than any other field of thought. Again, while experimental methods may no doubt be capable of much improvement, it seems a tenable view that this duty should be left to a special, and very advanced, department of inquiry. There might, perhaps, be formulated a system of advice for Discovery in general, — rules and hints important even to the

leading men of science. But in the meantime, Logic (as usually understood) can hardly help containing a good deal of elementary matter, and is compelled to take for granted in the learner a power of making very elementary mistakes. It seems that the best Scientific Discovery must always be in advance of Inductive Logic, in much the same way as the best employment of language runs in advance of Grammar. Still, there may be some use in trying to direct and help those who are not already scientific, or only in the earlier stages of the pursuit; nor need the name of Logic compel logicians to claim a dignity beyond their power. One cannot fulfil successfully the duties of Lord Chancellor and Justice of the Peace at once.

As regards Common Sense, it is a little more difficult to avoid coming into conflict here; since there are plainly two kinds of Common Sense,—one the essence, and the other an undying enemy, of the most perfect use of reason. Against near-sighted dogmatism, or the self-satisfied refusal to see distinctions, or the habit of slurring over awkward facts, Logic always intends to carry on a war: but we need not therefore assume that depth or distance of vision, or the practice of splitting hairs or of raising ingenious doubts and difficulties, can never be pushed beyond the limit at which they possess a practical value. The drawing of this line is a standing difficulty which cannot be settled off-hand, but needs the utmost patience: at present, it seems to me, one can only admit the difficulty and remember that the needs of practice

have an older and more final claim than those of curiosity. And, *mutatis mutandis*, the same applies to the objections from the side of Art: here, also, two different spirits may be clearly distinguished, one fighting really on our side, though perhaps by other methods, and the other fighting against us indeed, but an enemy deserving little else than contempt from healthy people.

But perhaps the special difficulty in the case of Common Sense is that to the simple-minded all things are simple and straightforward. The knowledge of difficulties and of dangers is already an advance beyond mere childish innocence of evil. As Mrs. Farebrother, in *Middlemarch*, is made to say, "When I was young, Mr. Lydgate, there was never any question about right and wrong. We knew our catechism and that was enough; we learnt our creed and our duty. Every respectable Church person had the same opinions. But now"—alas! the reverence for easy-going certainty is lost. So in the kindred question of bodily disease: to our grandfathers, and still more to their grandfathers, diseases were few in number but quite unmistakeable when they came: premonitory symptoms were almost things unknown, and degrees of health were only reluctantly admitted possible. And yet the death-rate is decreasing: our ancestors died by thousands of diseases which we are conquering. Very similar is still to a great extent the attitude of Common Sense towards Fallacy. "Did God make men two-legged only, and leave it to Aristotle to make them rational?" Nothing is harder than to induce short-sight or super-

ficiality to believe that any extension of view or of insight exists beyond that to which Common Sense is accustomed: although the actual telescope and the microscope cannot now be treated as mere toys, yet outside the realm of material objects the telescopic and the microscopic spirit is still, by many, considered almost worse than useless. The general reader has, in fact, a rooted belief that Logic is a highly unpractical body of doctrine: unpractical perhaps not only through shortcomings of its own, but from the supposed fact that no one but an absolute fool can ever commit a fallacy. Is not the light of Nature worth more than all the reasonings of all the logicians that ever lived? Such an appeal to idleness is always sure to win a large amount of ready applause. The view here taken, on the contrary, is that many things are believed in the name of Common Sense which a higher Common Sense would condemn, and that no one who is merely human can avoid fallacy altogether for a day.

Another fact moreover which operates to prevent any widespread interest in Logic is, no doubt, its barrenness in surprises. In all the physical sciences, Common Sense is being constantly forced to acknowledge that its methods are not so infallible as our fathers fondly supposed. Even the question "Am I not to believe my own eyes?" carries no longer the same conclusiveness as formerly, while every day some new portion of firmly held popular faith is shown to have been delusive or incomplete. Nor is it only in what are commonly called

the Physical Sciences that this is the case. Political Economy, though it depends so largely on mere carefulness and consistency of thought, is rich in unsuspected facts. In Mental Science, and perhaps in Ethics, a harvest of surprises is ripening. But in Logic the case is different. The central practical doctrines of Logic have been so long ago made common property that to a great extent they have passed into commonplace: which is much the same as saying that they commonly command verbal assent too readily for real assent to be strong. They lose the strong support that comes from conquered doubt, and through supposed familiarity pass into real oblivion. Hence it is chiefly in generalising what is already known, and so preserving it in a shape more easy to remember and apply, that the value of Logic consists. And therefore it is difficult to prevent its doctrines being tedious or exasperating, even where they may be most required.

There are one or two minor objections to the study of Logic,—even practical Logic—which may be just mentioned here as possible stumbling-blocks. One sometimes hears, for instance, that there are so many systems of Logic all at variance with each other that the puzzled inquirer cannot tell which to accept. On this it seems sufficient in the first place to remark that Logic does not claim to be a sort of revelation, which any one is requested to 'accept' at all, but rather a labour-saving apparatus which each may usefully alter somewhat to suit his own particular needs. Again, it is hardly too much to say that

whether the inquirer thinks for himself, or accepts the system of any one logician or of all, the result *for practical purposes* will be precisely the same, except perhaps as to speed in learning. In all that is essential to practice there is not only no difference of opinion but room for none. The disputed ground of Logic lies wholly outside that science when viewed as a machine for combating Fallacy. The disputed points refer, without exception, either to the question of the proper province of the science, or its convenient arrangement, or to the adjacent subjects of Metaphysics, Psychology, Rhetoric, or Grammar.

Another objection, only to be mentioned as unimportant, is that the study of Fallacies belongs altogether to Rhetoric rather than to Logic, and to Rhetoric in a degraded form. The effect of a study of Fallacy, it seems to be sometimes feared, must be to make us tricky, or at least to lead to wordiness and mere ingenuity of repartee. But let us at any rate meet part of this objection by ourselves refusing to let a harmless word offend. If the name Rhetoric be preferred let us accept that name without hesitation. And as to the question of fact, of the actual effect of a study of Fallacies, that of course is a matter on which there is ample room for difference of opinion, and I firmly believe that such study has on the whole a depressing and disarming effect on the power of being successfully sophistic, even where the will to deceive is present. For really effective sophistry nothing is so vitally requisite as semi-innocence. Just so far as the

epigram holds true that unconscious hypocrites are the greatest hypocrites of all, so may we say that the self-deceiver is the most successful sophist. Of course, by definition, Fallacy and Sophism are distinct,—the latter is clever deception, the former only honest error; but the line between them is in real life so dim and wavering that the distinction is practically useless for most purposes except that of giving our neighbour an uncomplimentary name. Witness the case of the highly respectable, and even honourable, man who late in life begins to find cherished theories untable. By the hypothesis his defence of them can be considered pure fallacy no longer, and yet would it not be cruelly unfair to class him with conscious sophists? Effective sophistry of the more conscious kind can only take place either where the audience are immensely beneath the sophist in acuteness or where they are positively eager to be deceived. And these may, from a general point of view, be regarded as exceptional cases. We are mostly subject to the criticism of our equals, and the real belief is widely held that, after all, truth so far as attainable is an end to be desired.

Another objection sometimes heard is that there is danger in tampering with mother-wit by substituting for it the highly abstract, narrow, inelastic rules of Logic. Real life, it is said, is large and complex and many-sided. To deal with actual problems successfully, a quickness and breadth of perception are needed, which must be largely unconscious, under pain of being in-

complete. Much in the same way as the hard rules of grammar are vexatious to those who know their mother-tongue, or as a deliberate effort to remember how to spell a word is apt to raise needless doubts and difficulties, so, it is sometimes held, does highly conscious reasoning produce more evil than it conquers. This objection has some real force, and in our last chapter there will be occasion to speak of it again. At the present stage it may be sufficient to remark that although, no doubt, a little knowledge is a dangerous thing, yet rightly understood that fact is, in ordinary circumstances, merely an argument for trying to attain as much knowledge as possible. The fact of the danger once recognised too, it becomes to a great extent disarmed. The amount of knowledge required to get beyond the dangerous stage in Logic is easily attained: and with or without that knowledge the application of Logic is mainly dependent on practice rather than on theory. All that theory can expect to do in the matter is to clear the way, and so to economise a great deal of time at the beginning. No book on Logic can be used as a *vade-mecum*,—carried in the pocket and consulted when in doubt whether to take a cab or not, and in other daily difficulties of the kind. If any reader is inclined to expect such aid he will certainly be disappointed. The point of view and the expectations must be altered, or there will be little good to be got from any book. Nothing can be a complete guarantee against all fallacy; nor can Logic be made an instrument for testing or

judging off-hand the truth of all possible propositions put forward.

II. The Practical Side of Logic.

"We are, then, not here properly or directly concerned with any of the disputed questions of Logic: we need not even discuss the nature of that science or the limits of its province. And yet the matters we shall have to treat constitute in themselves the main thread which runs through all logical doctrine, and the final object for which it has been developed. By making the practical purpose of Logic the central point of interest, we help to gather up and bind together its disconnected parts.

Logic may in fact be viewed as a machine for combating Fallacy. Like all machines, too, it is itself capable of much improvement in the certainty, the pace, and the fineness with which it performs its work. But unlike machines of lifeless material, its final purpose is in constant danger of being forgotten for other interests, as men sometimes lose sight of their main intention, take means for ends, and become misers or enthusiasts. Logic is rather a living organism than purely mechanical, and it is full of rudimentary organs which have historical and explanatory interest, but not all of which are now any longer useful for performing work or preserving the life of the science. The Logic required for examinations is thickly over-grown with disputed questions properly belonging to other departments of inquiry: and though

many of these discussions are of great value in themselves, and some perhaps also for developing still further the theory of Logic; though no one can consider himself a thorough student of the science until he knows, at least in broad outline, the history of these disputed questions, yet there are points of view from which we may usefully neglect them, may avoid all doubtful matters, fix attention solely on the practical means of fighting fallacy, and, as preliminary, sum up the admitted doctrines which bear directly on that purpose, to the exclusion of all the rest. We shall neglect, therefore, all inquiry into the proper 'province' of Logic. If any reader prefers any other name for the doctrines here treated, no objection will be raised. It is our business to inquire what the doctrines bearing on the above-mentioned purpose *are*, not what they may best be called. If through the employment of a wrong name any discoverable error should arise at any point, that point will present a convenient opportunity for correcting our definition. Provisionally, however, and with this apology, we may use the name of Logic.

Next, we shall neglect, as said above, all 'ultimate' questions; all questions of purely metaphysical interest. And here it seems necessary to remove a possible misconception. There is an active hostility to Metaphysics which has exasperated some metaphysicians into declaring that we cannot do without them. Metaphysics of some sort, they tell us, there must be. The only alternative is between good metaphysics and the cheap substitute

that Positivism provides. Without stopping to inquire whether possibly other alternatives might be discovered, I may remark that what is here meant by neglecting metaphysical discussions is simply leaving the decision of the question *which* system of metaphysics is, on the whole, the best, until some occasion when the pressure of more immediate practical needs has been relieved. The most ardent metaphysician would hardly contend that an unexceptionable system of metaphysics is a necessary of daily life; and it is entirely with explanation and prediction regarded from an everyday point of view that we are here concerned. Having satisfied more immediate needs, readers can proceed for themselves afterwards to the more remote. The attempt to *begin* with Metaphysics, however natural it may be, is rather too much like attempting to write a flowing hand while we ought to be practising pothooks. It is a fair description of the 'practical' spirit in Logic, to say that it consists chiefly in the intentional neglect of these deepest difficulties.

We start at any rate with all assumptions on which the meaning and use of language depends; and with those which are necessary in order that explanation and prediction (for practical purposes) should be possible. We assume, for instance, that the distinction between the subjective and objective Universe has a real value; and also that the whole Universe may be usefully parcelled off into definite 'nameable things,'—objects qualities, events, and classes of these,—which, for all

practical purposes, may be viewed as consistently breaking its continuity. As corollaries to the second of these assumptions, or as an amplification of it, we may accept the formulæ known as the 'Axioms of Consistency,'*—the Laws of Identity, Contradiction, and Excluded Middle. Secondly, as regards the Metaphysics of Causation, we avoid the ultimate difficulties simply by stopping short before they are reached, and by confining our attention to what may be called a lower point of view. We assume the existence of uniformities in Nature,—natural laws; the narrowing down of these into exactitude being the endless problem of discovery, and the completest knowledge of them already attained at any period being, for that period, the basis of all explanation, prediction, and proof.

The difficulty of keeping the discussion of Fallacy clear of psychological questions will be obvious to all readers of Mr. Sully's recent work on Illusions; but the scientific treatment there given, a treatment of the subject directly from the psychological point of view, helps to absolve us here from attempting to deal with its difficulties. Logic is always in some danger of entanglement with Psychology, but by keeping the practical purpose prominently in view, we probably avoid, better than in any other way, confusion between the two distinct sets of questions. It is only with the regulative laws of thought that Logic has any direct concern. Whatever psychological doctrines may be here occasionally

* More properly 'Postulates.' Also called 'Maxims:' cf. *infra*, p. 105.

appealed to, must accordingly be considered as of quite secondary importance.

Against confusion with Rhetoric we shall find it more difficult to guard. The connexion between Practical Logic and Rhetoric is extremely close, and for those whose interest lies in accurately mapping out the boundaries of either science, must no doubt be very puzzling. Rhetoric is commonly considered as the science of Persuasion (and possibly also of Pleasing) by means of language,—persuasion whether to true or to false conclusions; and since Persuasion partly depends on showing the person to be persuaded an appearance, whether real or counterfeit, of truth—of absence of fallacy,—the importance to it of a thorough familiarity with Logic is obvious. Rhetoric can hardly exist, in its most powerful shape at least, without a considerable knowledge of the difference between sound and unsound reasoning. It may, in fact, on its argumentative side, be viewed as an embodiment of Practical Logic, used by one person upon another or others, and applied indifferently either in aid of the purposes for which Logic properly exists, or in antagonism to them. But though Rhetoric cannot exist without Logic, the latter science can, it seems to me, exist apart from the former. As Mill expressed it, if there were but one rational being in the universe, that being might be a perfect logician; Logic, in this sense, is in fact simpler than Rhetoric, and preliminary to it.

The connexion between Logic and Grammar is per-

haps not quite so confusing, though still not altogether easy to avoid. Both Logic and Grammar sit in judgment on the *meaning* of assertions made. Both are concerned with the use of language, and both lay down rules for its correct employment. In one sense, therefore, Logic may be regarded as only a wider Grammar; not indeed as presuming to dictate the absolute meaning of any given set of words, but as legislating unmistakably in certain cases on the combined meaning of any two or more separable assertions when their separate meaning is already agreed upon or declared. While Grammar, for instance, tells us that two negatives make an affirmative, Logic takes a wider view and says in effect "Use whatever words and phrases you please (however ungrammatical) so long only as their meaning is clearly agreed upon; but having agreed on the meaning of your terms and your propositions, two contradictories fill a Universe, and to deny the one is to assert the other." The main difference, perhaps, is that while Grammar is solely concerned with enforcing the prevailing *fashion* in language, and thus with preventing solecism, Logic cares not at all what the fashion may be, insisting solely that meaning shall be in the first place agreed upon, and then consistently preserved. In Logic, a largeness of interpretation is needed, which is quite unknown to Grammar; for its sole concern is, through preventing inconsistency, to strike at the root of Fallacy. At the same time it is not always quite easy in practice to keep the two purposes wholly distinct, since Logic finds great con-

venience and great economy of time, in making some use of accepted Grammar. A certain amount of Grammar, as also a certain amount of Psychology, is one of the necessary foundations for any effective study of Logic. Accordingly, while we shall have occasion sometimes to neglect side-questions interesting in themselves, but whose interest is of grammatical rather than logical importance, yet from our point of view language is a necessary instrument, and the accepted rules of its employment are of high convenience; and hence it may no doubt be found sometimes a little difficult to separate the two interests of Logic and Grammar.

In short, so far as any question, whether commonly treated as a logical one or not, has a direct and obvious bearing on the methods of combating Fallacy, to that extent it will deserve our consideration: so far as its bearing on our main purpose either cannot be traced, or is too remote and lengthy for satisfactory treatment, to that extent we shall simplify our work by avoiding it.

The practical purpose of Logic being, then, the guidance of our reasoning as safely as possible through the dangers to which it is exposed, it remains to explain and to limit this purpose more particularly. 'Guidance' is slightly ambiguous, since a set of hints and rules aimed purely at increasing our powers of *discovery*, might fairly be held by some to come under this designation. But it is entirely with *proof* that we shall be concerned: with the reflection on our inferences, not with inference or discovery itself directly. Indirectly, of course, the

methods of proof are auxiliary to discovery, but it is of great importance to keep the two purposes distinct. For proof there must always be in the first place a proposition to be proved, or *thesis;* while, in inference, this is the final goal of which we are in search, and which is then rightly called the conclusion. Roughly speaking, every thesis is of course itself an inference, but an inference (or conclusion) does not becomes a thesis for proof until we reflect upon our reasoning, and desire to examine the strength of our grounds for the belief. Guidance, therefore, must here be taken to mean not the first vague hints that may set us on the track of a fruitful inference, but the methods for conducting an impartial trial upon conclusions already somehow reached. The methods of Logic cannot be employed for the direct purpose of enabling us to reason, but only for that of enabling us to know whether in a given case we *have reasoned* correctly, or at least to discern where the weak point in our certainty must lie.

'Reasoning' too demands explanation. By some (*e.g.* Whately and Hamilton) an attempt has been made to restrict the name to the process of unfolding our conceptions, syllogising, or concluding from generals to particulars; errors in reasoning being taken to mean simply failures in consistency. In this sense of the term, a child who had once been scalded through putting his hand into a basin of hot water, might be said to *reason correctly* in dreading a basin of cold water on the next occasion; but he would then "reason correctly"

by means of a premiss materially false,—that premiss being of course some such universal as '*All* water in a basin will scald,' or some such application as 'This is *hot* water.' In another of its senses, to reason is, as Mill puts it, simply to infer (whether provisionally or reflectively) any assertion from assertions already admitted. And since Mill's definition is perhaps most in accordance with ordinary usage, and further since it enables us to bring under consideration the dangers in Inductive or Empirical Proof, it is in this sense that we shall here understand the term, adding however that it is against errors in reflective reasoning only that Logic can at all undertake to guard.

Methods of guidance might be discussed either from the positive side or the negative,—as supplying marks by which to recognise either valid evidence or invalid. The latter plan, as the name chosen for the book will have already shown, is adopted here. Not only is Fallacy in many ways more interesting than correct reasoning, but this view of the subject seems to me to keep before us, more distinctly than could otherwise be done, the negative character of practical Logic. The application of Logic is on the whole rather restrictive than forward-moving. As already said, it does not discover, but it proves, or tests, discoveries which claim to be already made. Moreover, in proportion as this negative or questioning spirit becomes habitual, our chance grows stronger of avoiding the character of an advocate, and attaining the judicial frame of mind. The

first condition of all for avoiding fallacy, must surely be, as Mr. Spencer expresses it, "the calmness that is ready to recognise or to infer one truth as readily as another." But besides this possible disciplinary advantage, and on the whole more important than it, the fact should be remembered that it is as the enemy of Fallacy that Logic must always find its application to real life: Fallacy occupies much the same position in regard to the science of Proof that disease occupies in regard to the science of Medicine.

In speaking of the negative character of Logic as a practical science, we must not however imagine that its action on belief is purely repressive. Rather, by repressing the natural tendency to undue belief, we earn the right to be doubly secure in those beliefs that stand the trial well. Of all unpractical habits of mind, the purely sceptical habit, so far as it can exist, is perhaps the least satisfactory; and if Logic really led no further than this, there would be strong practical reasons for determining to blind ourselves to its truths. But perhaps it may be found possible to keep the dangers of Proof in view, while still remembering the central purpose for which this is done; namely, not in order to discard as much pretended evidence as possible, but to win security in our beliefs, through taking care.

III. OUTLINE OF THE WORK.

The war against Fallacy is, I am afraid, far too large an enterprise to be undertaken by any one book,

or indeed by any one author. Whether or no it was possible long ago, to survey the whole field of knowledge, both in general and in detail, laying down the law for all men, and marking out the line between truth and falsehood in all departments, nothing of the kind is possible now: no one at the present time,—unless absolutely unaware of the modern developments of Science, and its innumerable fields of special research,—will presume to offer to his readers, a set of infallible methods for keeping free from error. There would be great danger, it is felt, of providing something not much more practical than Dr. Watts' rules 'for the right use of Reason.'

But there are certain broad laws (which may with sufficient accuracy be called Laws of Evidence in general) which are perfectly universal in their stringency, and which it concerns every one to have at his fingers' ends. Properly speaking these are laws, not of evidence itself, but preliminary to the operation to which the name 'judgment of evidence' is most commonly applied,—laws of *interpretation* (in a wide sense of that term), or, more exactly, laws of the *implication* of one assertion by another or others, whether the process of the given material inference be from the general to the particular, or *vice versâ*. The law here called that of 'Counter-indication' * may be mentioned as a typical example of what is meant; or the Maxims of Consistency, above referred to; or again, the law that all Proof, to be really

* Cf. *infra*, p. 84.

Proof, requires a reference to some wider generality* than the thesis. The knowledge of such laws is not by itself a sufficient safeguard against all possibility of error, but only a prior condition of attaining any safety in judging, even with the best possible special knowledge, or after the longest 'experience.' Such laws, though in reality extremely few and simple,—some even almost ludicrously self-evident,—present sufficient difficulties, in their application, to render the study of them, in regard to such application, a subject well worth careful attention: and a part of this task is what lies before us here.

It is evident that several different purposes in studying Fallacies may be distinguished. There is, for instance, the purely scientific or theoretical interest, whether as regards the Psychology of error, or merely with the view of obtaining an exhaustive list, and a clear tabular arrangement, of its varieties. Or on the other hand there is the practical interest (which may of course also be in the best sense scientific), leading to a survey of the methods of combating Fallacy in the shapes in which it actually occurs. And under this second head certain quite distinct purposes must further be noticed as possible. The methods of combating Fallacy admit broadly of three quite separable developments: there may be methods for (1) simply detecting fallacies already committed by ourselves or others; or (2) for convicting others of such errors when found; or (3) methods aiming at the attainment of the completest infallibility

* Cf. *infra*, pp. 112, 213, 329.

possible. Or, as we might more briefly express the same division, methods of diagnosis, cure and prevention.

Of these various subjects, our purpose here will be to neglect (as said above) the Psychology of error, and to aim at obtaining only such classification of the various possible forms of Fallacy as shall be of use for one or more of the three practical purposes above mentioned.

Next it may be remarked that, of these three, the last would be a truly desirable accomplishment, but that the total avoidance of Fallacy being a comprehensive subject, it seems better to attack it piecemeal, and by degrees. The *second* demands a combination of logical and rhetorical considerations for which neither Logic nor Rhetoric can be said to be as yet at all prepared: this subject, if less comprehensive than the last, presents at any rate a dangerously complex problem. Even the first question (the *detection* of Fallacy), if it is to be treated in any thorough manner, offers practical difficulties which might well render us content with a less ambitious aim: but since this first question is really preliminary either to success in controversy, or to the avoiding of Fallacy, the most effectual course appears to be to inquire in the first instance what can be done towards the accomplishment of this simpler purpose. The power of detection is in fact the first stage towards avoidance; which follows gradually, as detection becomes habitual.

We shall find, however, that this purpose itself admits of being divided further. Some only of its elements, as preliminary to the whole problem of the detection of

Fallacy, will constitute the matters for our consideration. As already said, we shall be concerned mainly with the methods of Proof and Disproof, and with the points at which any case of attempted Proof or Disproof is liable to break down. In this way, at least, a rough ground-work will be laid, from which any of the practical questions may afterwards be approached. The mere laying of such foundations should of itself help materially in the *detection* and *avoidance* of Fallacy,—though it can of course contribute nothing to their exposure so far as this lies beyond and outside detection.

Shortly, then, the work before us is to survey, classify, explain, and illustrate the possible objections which can be brought against any belief, so soon as it is definite enough to take shape in language, and thereby to become a thesis for proof. An exhaustive review of possible objections once taken, the formation of methods for detecting and avoiding Fallacies becomes less difficult; and, accordingly, some suggestions are incidentally made for carrying on the work towards this goal.

Since any pretended assertion may be:—

1. Meaningless:
2. Mere unsupported assertion:
3. Insecurely supported:

this will constitute our main primary division. In the first case, of course, *cadit quæstio* as to the truth of the assertion. In the second case we have to reckon with the Burden of Proof. And finally, if a reason be given for belief, our judgment of its force must depend pri-

marily on the extent and soundness of our knowledge of the methods of proof; afterwards, on our knowledge of the special subject in question.

"People talk about evidence," it has been said, "as if it could really be weighed in scales by a blind justice. No man can judge what is good evidence on any particular subject, unless he knows that subject well." This is perfectly true: knowledge of the special subject is required before we can judge of the material truth of all that our reasons formally imply. But so long as ignorance of these formal implications themselves exists, the methods of Logic have useful work to do. It is just in making clear what these formal implications are,—in making us aware of the full extent of our assertion when we bring forward any reason in support of any thesis,—that the central practical interest of Logic consists. Beyond this, in fact, it cannot go: in Logic as in Law *Ignorantia facti excusat, ignorantiâ juris non excusat.* It may be added, however, that there is no immediate danger of Logic's occupation coming to an end. People still commit purely logical blunders, quite apart from any ignorance of the special subject.

Next, whatever reason is given in support of an assertion made may fail to prove it in either of two ways. It may be:—

(1) Materially false, even if sufficient:

(2) Formally insufficient, even if true:

With the *truth* of the Reason given we have nothing to do in Logic. That is to say, we can only call for *its*

supports, for the supports of these again, and so on until we reach some ground sufficiently firm. Accordingly, a knowledge of the requirements of *formal adequacy* (apart from the question of material truth) is not only all that any science of Reasoning can provide, but so far as complete, would be a safeguard against all discoverable error. The point at which logical doctrine *per se* falls short of this complete success, has been above vaguely indicated. Later we shall be in a better position for seeing more definitely how far the help of Logic alone can carry us.

Finally, the reason or reasons given in support of an assertion either include in themselves the *meaning* of that assertion or do not. In the former case the question as to their material truth becomes at once all-important; in the latter case the central operation of Logic begins. For if the Reason given does not already include the Thesis in its meaning, some other assertion is required to complete its binding force: and it is in the adding of this further assertion that all the danger lurks. The theory of Proof in general will guarantee our supplying the further assertion *correctly;* while it is the question of the material truth of such further assertion that often depends in great measure on our knowledge of the special subject.

Our work, therefore, will consist first of all in a preliminary survey of the nature of Proof in general, its subject-matter and its process. Having cleared the ground in this manner, we shall proceed to take in detail the objections which can possibly be brought against

any assertion, dealing first with those objections which arise before Proof begins, and afterwards with the various points at which any case of attempted Proof is liable to frustration. Under this last head will be found, in one sense, the main difficulty; since here we shall have to consider to some extent the different dangers introduced by the different varieties of Proof. It is hoped, however, that these minor distinctions will not unduly obscure our more general views. In *all* cases where real (as opposed to verbal—*Cf.* p. 204) reasons are brought forward in support of an assertion, the operation of Logic consists in forcing into explicitness whatever is implied beyond that which directly appears. The central point of interest throughout is the accurate determination of the further assertion implied in giving any Reason in support of any Thesis.

PART I.

PROOF IN GENERAL.

CHAPTER I.

THE MEANING AND AIMS OF PROOF.

I. Proof and Inference.

One of the distinctions which it is most difficult, and at the same time most important, to keep in view, is that between Proof and Inference. In any treatment of Logic, confusion of these two separate processes is likely to lead to much obscurity; and for us such confusion would be certainly fatal, since our main object is to simplify as far as possible the highly complex problem which the avoidance of Fallacy presents, attacking in the first place the most preliminary difficulties: and, as will presently become evident, the *detection* of Fallacy is closely bound up with the whole question of the needs and dangers of Proof, while the attainment of methods for rendering our inferences secure corresponds more nearly to the wider and deeper problem of *avoiding* Fallacy altogether.

Nor will it be sufficient for us to rest content with the brief and easy-going dismissal of the difficulty which is sometimes accepted. It may be perfectly true, as

Whately (*e.g.*) says, that "Reasoning comprehends *Inferring* and *Proving*, which are not two different things, but the same thing regarded in two different points of view: like the road from London to York, and the road from York to London;" but if London happens to be the place we want to reach, it becomes a matter of some importance to distinguish carefully between the two different directions. It will not suit us to find ourselves eventually either in York, or wandering for ever between Grantham and Peterborough. For neither of these results shall we derive much consolation from reflecting that it is "the same road, only regarded from two different points of view."

'Inference' is, in fact, a highly ambiguous word, capable of being applied to Proof as well as to Discovery; and all round the question lie a number of further verbal ambiguities. When we infer one fact from another or others, we believe that fact 'by reason of' our belief in those others; and when we prove one fact by means of another, exactly the same expression is commonly used. In both cases there is 'reasoning,' and accordingly both that from which the inference is drawn and that on which the proof is based are indiscriminately called, in popular language, the 'reason.' We reason when we proceed from premisses to conclusion, arriving at new truths by means of old ones; and we reason when, having already a thesis (an assertion) before us, we produce arguments to support it, even if such arguments be then for the first time thought of. Again, 'premisses' is some-

times used for the grounds of Proof, and sometimes for the *data* of Inference: 'conclusion' sometimes means that which is discovered; and sometimes that which is proved. These ambiguities are probably one great source of confusion in the matter; but besides the merely-verbal connexion between Proof and Inference, and perhaps in fact a cause of it, there is also a deeper and real connexion to which still more of the difficulty may be traced. Before we can infer safely, we must prove; but before we can prove, there must be some belief set up for proof, and belief (at least in its more definite forms) always draws a large part of its life from prior beliefs, and is therefore already an inference. There are, in fact, 'inferences' and 'inferences,'—our first vague guesses, and the last assured results of careful inquiry and copious hostile criticism. Again, in some cases and to some extent, the reasons to which we appeal as proof of a given belief are exactly those which in fact led us to the belief in question. This is indeed far from being always the case, since in very many instances the causes of a belief are too numerous or too shadowy to be remembered in detail, or even to be summed up in any concise expression. We need not base this assertion on any reference to the more physiological causes of belief: quite apart from the uncertainty of these, and even assuming the causes of belief to be purely intellectual, who can tell exactly why he believes his neighbour worthy or unworthy of confidence? Or who can sum up satisfactorily the multitude of indefinite observations that go to

support the judgment, 'That is a well-dressed woman,' or 'This is a windy sky:' what are the signs, exactly, by which we recognise a friend's step, or feel the pulse of an audience, or judge some work of art? In these and many other cases only a small part of the real cause can ever be given as a reason. Nevertheless, the causes of our belief may often be appealed to, if we can remember them, as a reason for believing: the same facts may be grounds of Inference and of Proof.

As a preliminary step, then, we may find some advantage in correcting these ambiguities by the employment of two different names. Although 'Inference' might no doubt fairly be taken as having both a forward and a backward reference, thus covering both fields—Discovery and Proof,—there will be great convenience in restricting it as far as possible to the former of these two meanings;* and also in keeping the expressions 'a conclusion' 'drawn from' (or 'following from') its 'premisses' (or '*data*') for the case of Inference, and using for the case of Proof the expressions 'a thesis' 'guaranteed by' its 'reasons' (or 'resting upon' its 'grounds'). By the name Inference we denote the process of reaching a belief: by Proof we mean the process of establishing it on a firm foundation after it is already somehow reached. The inferred belief, before reflection on its validity begins, is not yet a thesis with reasons given:

* Chiefly because 'Discovery'—the only other name which seems at all applicable—is apt to fix attention rather on the result than on the process.

these only come into existence when we begin to test the foundations of a belief put forward as secure.

The problem of Proof is thus always narrower and more definite than that of Inference. Instead of asking at large '*What* conclusion may be drawn?' Proof asks 'Is such and such a given conclusion warranted?' Instead of 'What is the cause, or effect, or nature, of A?' or 'What is the law involved?' Proof asks 'Does X stand to A in this relation?' 'Is such and such a law the true one?' Instead of having, for answer, to choose amongst all the letters of an indefinitely long alphabet, Proof has only to decide between the two alternatives,—Yes, or No.

II. PROVING AND TESTING.

It must not, however, be supposed that by thus contrasting Proof with Inference all has been done that is necessary to bring out its full meaning and to avoid all ambiguity. Is Proof the *finding* of guarantees, or their *examination* when already found? Is it the attempt to establish a given belief, or the attempt to break it down, or neither of these exactly?

In this matter also popular usage is not consistent, though on the whole it leans rather to the meaning that makes Proof consist in the finding of guarantees. If the view here taken be correct, there is a possible reconciliation between these apparently opposite meanings, and either by itself is merely incomplete. For some purposes, no doubt, it may be sufficient to say that proving a belief

consists in establishing its truth, but this definition after all carries us only a very short way. Nor will it suffice, when asked further how a truth is to be established, to answer that the process consists in 'stating a valid reason' for the belief in question. This, too, is true as far as it goes: to prove an alibi, for instance, or to prove the defendant's guilt, means to establish the truth of the assertion that the defendant was elsewhere, or is guilty; and no doubt the process always consists in showing a valid reason why the assertion should deserve belief. So again, to prove that the angles at the base of an isosceles triangle are equal to one another, means to establish the truth of that proposition; and the manner of performing the process certainly is by showing a valid reason, or a set of valid reasons, why we should believe it to be true. But there is an important fact about the meaning of Proof which this explanation tends to make us overlook. The word Proof, like so many other words, has undergone a change of meaning in the course of its history. In old times, to prove anything meant simply to *test* it, to see what strain it would bear or what fault could be found with it. Nothing was implied, one way or the other, as to the result of the inquiry: the thing to be proved might pass the examination with honours, or might fail ignominiously, but in either case the proof took place. Thus, "the exception proves the rule" meant simply that the exception tries, or strains, the rule: "I have bought five yoke of oxen and must needs go and prove them" referred merely to the need of *trying* the

oxen, or testing their working power. And to some extent this old meaning may, perhaps, be said still to remain in use; to take a thing 'on probation' still allows us to contemplate the possibility of discarding it later as useless, to 'probe' is a confessedly tentative pursuit, and a lover may 'prove untrue.'

It is, of course, often misleading to attempt to find the modern meaning of a word by tracing its history. In very many cases any attempt to bind words down to their ancient meaning would lead to serious error. And yet if the historical inquiry be properly guarded, it may sometimes serve to throw a light on the modern meaning which would otherwise be lost or overlooked. We must certainly avoid supposing that to prove an assertion means nowadays simply to subject it to tests, but at the same time by remembering this ancient sense we learn some facts about the meaning and aims of Proof which are really inseparable from it, and which the modern employment of the word rather too much tends to hide. Be this, however, as it may, for our purposes at any rate it is in attack rather than in establishment that the interest lies; or at least only in such establishment as may be won in open battle. Our concern with Proof differs from that of the advocate in that we are not interested in the finding of evidence to support a thesis, but only with the judging of evidence already put forward; or, on the other hand, dismissal of the case when all evidence is wanting or when no definite issue can be joined.

Viewing Proof as essentially consisting in *successful*

resistance to attack, we in the first place keep before our minds the limit of dogmatism beyond which no real proof can carry us. It is true that assertions which have been tested so far as our tests can go, stand in a better position as regards trustworthiness than assertions which have not been tested; and since in multitudes of cases the tests applied are amply sufficient for all practical purposes, Proof has come in course of time to mean chiefly establishment on a sound basis. Even the completest establishment of a truth is, no doubt, limited by our very finite power of applying tests to it; but this we easily, and for the most part wisely, forget in the presence of the plain and fruitful fact that our power of testing belief is in so many cases practically sufficient. It would be pedantic and absurd to be always remembering that our tests may after all be incomplete. When we, or those whom we accept as sufficient authority, have tested the assertion that the earth is round, or that matter gravitates, it will be found on the whole more useful to act on all occasions precisely as if those assertions were absolutely true. Having arrived at Melbourne by way of Suez, we should hardly, through modesty as to the limits of human knowledge, hesitate to sail for Europe again in an easterly direction. The belief that the earth is round is certainly *only* proved—only tested and not yet found wanting,—but we get from our tests, in that case and in many others, a kind of certainty which on the whole it is wiser not to doubt. Fallible though we are, and incomplete though

our methods of proof or testing may be, yet there are strong practical reasons for considering our knowledge in some cases perfectly secure, certain kinds of proof sufficiently complete.

Although, then, simply testing is in this way the root-idea, or original intention, of the word Proof, the full meaning we shall understand by it is establishment by means of tests; or, more fully, establishment in the face of hostile criticism. Not until both sides of a case are heard can the verdict claim to be of real value; and if we accept a conclusion without considering how far the facts will support an opposite one, we do so at our peril. Thus, in fixing the meaning* of a name, the point of practical importance is where to draw the line, or how to distinguish the thing in question from other things; in establishing an explanation, a law of nature, or a prediction not yet verifiable by the event, the important point is to exclude all alternative theories. We know, for instance, what 'work' is, roughly, and we use words like 'civilisation' or 'honourable'—and even terms aiming at greater definiteness, as 'animal,' 'vegetable,' 'man,' and 'beast'—with the utmost glibness, and with a fair amount of sense: but the whole difficulty of fixing their definitions, or settling their exact meaning, begins when we attempt to draw the line dividing them from their opposites; when, in fact, we try to justify our exclusion of certain candidates for the title. We must know clearly what is *not* work, if we are to find the

* See also pp. 93, 106, 133, *inf.*

stricter applications of the word; we must determine (if possible) where civilisation ends and its opposite begins, or what are the exact points of difference which separate animal from vegetable, man from beast. Again, before we can consider any theory proved, whether such theory be a sweeping law, like that of gravitation, or an explanation or prediction of some one actual event, we must have sound reasons for excluding every possible rival theory.

This, at least, would constitute complete Proof, if such could ever be attained: so far as it falls short of this, our proof is weak. The exhaustive examination of alternative theories is of course an ideal which we cannot completely reach; but the nearer we approach to it, the more thorough is our proof, the less assailable our certainty. Thus assertions stand on a varying scale of credibility: which is only another way of saying that evidence varies in strength.

In proportion as the attacks resisted represent all possible attacks, Proof is complete. Hence the importance of our central question,—On what grounds can any assertion be attacked? And first we need a general view of the nature and varieties of assertion; a classification of the questions that may arise for Proof.

CHAPTER II.

THE SUBJECT-MATTER OF PROOF: IN GENERAL.

I. Real and Unreal Propositions.

Having sketched thus in outline the distinction between Proof and Inference (the only other process with which Proof is liable to be confounded), the next point of preliminary interest appears to be the subject-matter on which Proof is employed. I say of preliminary interest, because on the plan to be here adopted, we need in this place attempt to treat only a very small group selected out of all the complicated questions, so important and so fundamental in the higher study of Logic, centering in the doctrine of Proposition, or Assertion, or Judgment. For we are not concerned in any direct way with the Psychology of either Perception, Thought, Judgment, or Inference: Proof is concerned with ready-made Assertion only. At present we have only to notice certain broad distinctions in kinds of Assertion, with especial reference to the bearing of these distinctions on the question of Proof. A judgment is a Thesis only when

capable of expression in intelligible language, and while the need for Proof is felt.

First in importance for us is the distinction between *Real* and what may be called *Unreal* propositions. The latter of these are insusceptible of Proof: the former are its subject-matter.

The name 'Unreal' as here applied to propositions, is somewhat wider than what is usually meant by 'verbal.' Usually the distinction between real and verbal is taken to correspond precisely to that between 'accidental'* and 'essential' propositions; verbal propositions being restricted to mean such only as are *tautologous* or *identical*,—those in which the Subject† already contains, as a part, at least, of its meaning, that which is asserted of it in the remainder of the proposition. Thus, 'A triangle is a three-sided figure' is commonly given as a typical example of the verbal proposition. But for our purposes we need some name to express indiscriminately all kinds of assertion which are insusceptible of Proof; and in order to avoid ambiguities I propose to call these 'unreal,' rather than verbal. In itself the name 'verbal' might certainly be held to designate very appropriately every proposition which is merely a string of *words*, fulfilling, it may be, all grammatical requirements, but without conveying sense,—mere empty sound so far

* Or, as the corresponding 'Judgments' are termed (by Hamilton and others), 'Ampliative' and 'Explicative,' or (by Kant) 'Synthetical' and 'Analytical.'

† 'Subject' we may define provisionally as 'that which is primarily spoken of.' There will be more to say about it presently.

as possibility of interpretation is concerned; but 'verbal' is a name already in use for a more restricted purpose.

At this stage it is not necessary to face the question as to the means of distinguishing in practice unreal propositions from real. Such inquiry belongs to a later place in our scheme, and will there be to some extent discussed.* At present, we have only to register the fact that unreal propositions are to be met with,—empty shells of assertion without a kernel,—and to set out the heads under which these may be conveniently divided.

In the first place, then, comes the case, already spoken of, where the assertion is already made as soon as the meaning of the 'Subject' is understood,—tautologous, or essential, or identical propositions. It is easy to see that where that which is said of a thing is that which is known already, or rather that which is already told as soon as the Subject is enunciated, the proposition (for in form it may still of course be a proposition, containing nominative case and verb) lacks, if not *raison d'être*, at least capacity for proof. The mere attempt to prove any such proposition involves a vicious circle in our thoughts. We have prejudged already, by hypothesis, the question of its truth, and inquiry can lead but to one result—a result which might have been reached without the labour. If, for example, a coroner's jury were to give it as their solemn opinion, that 'deceased came to his death by extinction of the vital forces,' it would require no great effort to see that this supposed piece of informa-

* See pp. 120–147.

tion leaves us exactly where we were before. This, however, is rather an extreme instance. Perhaps the commonest case of all is where, in some shape or other, a proposition laboriously informs us that excess is not advisable,—as (in a discussion on local legislation in one of the Channel Islands,—I quote from a newspaper report) "The Bailiff said, it was essential that no measure should be unnecessarily adopted. On the other hand, everything necessary must be done." Or again, "I should not advise too great hurry," or "Growing lads and women should not attempt too much at a time." If 'too much' means anything at all, it means that on the whole the amount spoken of is *not advisable*, and in all such cases no real information is given until the speaker proceeds to say *how* much is considered by him excessive.* These instances are purposely chosen as being almost self-evident and indisputable. Later on,† we shall have occasion to notice some of the real difficulties in the matter.

In the second place come the cases where the assertion made is already *denied* in the meaning of the Subject —self-contradictory, or suicidal propositions. These, of

* It must be here remarked, however, that in many cases such assertions are merely blundering *expressions*, or grammatical solecisms, rather than absolutely without a meaning,—the speaker and his audience both having some actual amount dimly in view. There are also, no doubt, a few cases where 'too much' does not really intend to sum up the total question of advisability, but refers to some other standard, as in the sentence, 'It is better to have too much luggage on a journey, than too little.'

† See p. 124, *inf.*

course, stand essentially on the same footing as the class just mentioned. The question of their truth is prejudged already, only the reverse way. Perspicuous examples which are really faulty are less common here however, since the explanation of their actual employment is not so frequently as in the case of tautology a slipshod, do-nothing, easily satisfied habit of thought, but rather a youthful, reckless, revolutionary spirit, making use of poetical license in expression, or aiming at strong rhetorical effect. There is usually more life in self-contradictory assertions than in platitude, even if it be life of a rather uncurbed nature, and often these are used to convey in a forcible, epigrammatic manner, real truths which may indeed be paradoxical (in the sense of being contradictory to received opinion), but which are none the less worth knowing: still, as they stand, such propositions take their place outside the realm of Proof, since in Logic we are necessarily limited by language, whatever its faults may be. Luckily, however, an epigram that is worth anything may generally be translated into a real proposition if we can be content to sacrifice its merely artistic qualities; and since the practical value of these can only be for stirring up our sluggish attention, when this object is once accomplished we may safely relapse into a cooler state of mind. Where harm is done by self-contradictory propositions is not so much in the field of positive assertion as in that of doubt; where, for instance, doubts are nominally raised, by means of language, about something which language itself postu-

lates as a starting-point,—as (*e.g.*) "Can one individual be at the same time another individual?" Or, "By successive additions of nothing, can something be at last developed?" No question here can exist for Proof, as we shall understand that term, since the answer is given already in the postulates of language (otherwise known as the 'Maxims of Consistency' or the 'Laws of Thought'*), and language is needed in order to state the question.

This remark leads us to the outskirts of a very thorny subject,—namely the position of 'Ultimate beliefs' in regard to unreality. It may be said at once that they do not come within the subject-matter of Proof as here understood. Without attempting to determine, even approximately, the number or the nature of these ultimate beliefs, or to say anything further about them, it will suffice to acknowledge (if required to do so) that such there must be. Pushing back the examination of reasons for any belief we must of course either ultimately come to a basis of mere assumption, or go on questioning for ever. It seems best, therefore, at once to admit the existence of beliefs which may stand above, and not below, the possibility of 'Proof;' and then to relegate all discussion of such beliefs and their validity to those who feel desirous of examining them, and competent to undertake the inquiry. For us, in the mere capacity of logicians, and not metaphysicians, language limits thought; and we therefore start at least with the Postu-

* See also pp. 14, 105.

lates on which the meaning of language depends, dispensing with all attempts to climb outside or above them. Only so far then as a real meaning can be found in the answer Yes or No to any question,—a meaning expressible in consistent language and translatable, if need be, into terms of practice,—will such question come within our subject-matter. Wherever to doubt any belief,—*e.g.* that 'whatever is, is;' or that 'it is impossible for the same thing at once to be and not to be'—would nullify the postulated meaning of the language used, such belief (if it can be called a belief at all; but this may be conceded for the sake of peace) we will consider to lie above the possibility of proof. And wherever this does not appear to be the case then the grounds of the belief will be open to our examination, even if for the purpose of saving time or trouble it may be also open to us to dispense with such inquiry. The view appears a tenable one, and has been stated at some length by Mr. Spencer,* that certain supposed questions, commonly believed to be of metaphysical interest, cannot be strictly called questions at all, in any fruitful sense of that term: but since controversy is not here an object, it seems simpler to say that we choose to limit our own inquiry as above.

Thirdly comes the case where any term used in a proposition fails, whether through self-contradiction† or otherwise, to convey intelligible meaning. There is, so far as I am aware, no special name in use for this kind of

* *Principles of Psychology*, pt. vii. ch. iii.

† *i.e. within* the term, not between the two terms.

unreal assertions as a class, although certain forms of them have (very properly) earned the name of mysteries. These too, from the nature of the case, may safely sing in presence of the robber Doubt. So far as they are consistently incomprehensible, so far the question of their truth or falsity can clearly not be raised, except in words. Their acceptance, indeed, as a formula, may show a willing and tractable spirit, and they may to that extent have a value: but such acceptance differs of course from belief in being admittedly a voluntary act, and not a mere imperitorious and reluctant yielding to the brute weight of evidence. Here too it is somewhat difficult to find examples which shall be universally perspicuous,—unless we take such questions as were sometimes discussed by the Scholastics,—as whether two glorified bodies can occupy the same portion of space at once, or whether God knows more than He is conscious of; or the doctrines of the Cabbala,—that all souls pre-existed in Adam, that the human is united to the Divine mind as the radius of a circle to its centre, or that existence is infinitely distant from non-entity.

Besides assertions which are thus completely insusceptible of Proof, there are also many cases where Proof may *appear* to be inapplicable; which cases however must be carefully distinguished from unreal propositions. Such, for example, is the case where, though the belief is real enough, and quite possibly sound, proof is unattainable owing to the multitude or the intangible nature of the grounds of belief, or owing to the shortness of the

time available for their examination—as where we take a violent liking or dislike to a person at first sight, or have to decide in a hurry upon some complicated course of action. In such cases the incapacity for proof—if there be real incapacity—cannot be discovered by mere inspection of the thesis, but needs to be shown by external evidence. And unless and until this is shown in the given case, we have clearly no reason to treat it differently from any other real assertion.

Under the head of propositions insusceptible of exact proof it may be well also to notice that immense class of assertions, very commonly in use, whose essential nature is to be vague. Such assertions as that on the whole the ordinary meaning of a word is so and so, or that there is a growing tendency among civilised people to do this or the other; or, still more, the finer shades of suggestive, tentative assertion conveyed in poetry, jest, or innuendo: these afford, from the nature of the case, an insecure footing for the fruitful application of logical method. But these, too, stand on a very different level from unreal propositions, since the reduction of them to definiteness is not in any way precluded by their own postulates, but only difficult perhaps, or at any rate inconvenient on some ground or other. When we meet with one of these assertions, two courses are open: either to treat it in a spirit of generosity or carelessness, accepting it as claiming only a lower degree of assertive force, and as fulfilling its own purpose if not exactly ours; or else, if exactitude be for any reason really important, expending

the trouble necessary to render it as far as possible definite. Until this is done there is of course room for misinterpretation, and therefore no security for strict sifting of the question raised.

Lastly, it is obvious that many assertions which *might* be proved, do not in fact stand in need of it. There are a vast number of cases in which Proof is practically never demanded. That 'Socrates is mortal,' for example, or that 'Queen Anne is dead;' that 'some coins are metallic,' or some logical examples rather absurd; these are assertions which, for all practical purposes, may now be considered sufficiently safe against serious attack. Here, too, no general rule can be given for distinguishing propositions which have been sufficiently proved already from those which still stand in need of proof. This is one of the matters which fall quite outside the scope of Logic, and must always be decided between the assertor and his audience by special agreement. It is, in fact, merely preliminary to Logic, and in no way connected with the actual methods of Proof. To claim for a proposition, the truth of which is still highly doubtful, the advantage which belongs to one that has successfully resisted all attacks, is no doubt a common enough rhetorical device. So, on the other hand, is the attempt to obstruct an argument by raising unnecessary difficulties. But Logic cannot undertake to judge of motives. Later on, in speaking of the Burden of Proof, we shall have occasion to notice this difficulty more fully.* At present it is

* See pp. 154–167, *inf.*, also pp. 128, 171.

important to pass on to the discussion of Real Assertion, its nature in general; and to a broad classification of the kinds of Real Assertion that may be proposed for Proof.

II. SUBJECT AND PREDICATE.

It is on all hands admitted that every proposition, as soon as understood, may be divided into two parts—the subject, or name of the 'thing' primarily spoken of, and the remainder of the sentence, or the words expressing the whole assertion made about such Subject. If we denote the Subject, as is usual for shortness, by the letter S, we may denote the remainder of the proposition by the letter J—the Judgment made about the S.

In so general a science as Logic—or since the province of Logic is not yet clearly marked out, let us say in so general a science as that of Evidence, or Proof—we find ourselves constantly brought up against the difficulty of obtaining words wide enough to include all that we mean. Thus, though assertion always asserts 'something' of 'something' else—though 'everything' may have assertions made about it—yet it seems hardly safe to say that assertion is always about 'things;' unsafe at least without explaining that 'thing' is here used in the widest possible sense. Not merely every *thing* (as commonly understood—namely every material object) may be the S of a proposition, but literally *everything*, or *anything*, that can be named at all: everything that

can be spoken of, whether objective or subjective, real or imaginary, whole or part, great or small. The universe itself is a 'thing' in this sense, and so is every portion of it. Time and space are things in this sense, and so is the year 1882, or the point of the pen with which I write: so is the heat of to-morrow's sun, or the justice shown in my friend's remarks of yesterday: so is the word 'Logic,' or the meaning of that word, or the relation between its meaning and something else, or the character of that relation, or the fact that the character of that relation is beyond my power to state. We need some name thus to express in general 'anything that may be spoken about,' and in spite of the possibly misleading associations of the word here chosen (which at first sight may seem to demand tangibility almost, or at least visibility or weight) there is really no other name that will mislead so little. If we may say 'everything' in one word shall we not say 'every thing' in two? At any rate such employment of the word will here be postulated, in default of any other name to serve the purpose required.

Every proposition, then, so soon as understood, may be divided into S and J. But it may also be divided in this way *before* the proposition as a whole is clearly understood: namely, as soon as S alone is distinguished, and while the complete assertion made is still obscure. J itself is subdivisible, and until this further subdivision is ready to be made, the meaning of the proposition is not yet completely apprehended.

Mr. Venn, in his *Symbolic Logic** discusses three distinguishable views of the import of propositions—the *predication* view, the *class inclusion and exclusion* view, and the *compartmental* view; finally adopting the last as best suited to the purposes there aimed at, and especially to the solution of intricate artificial problems. But there is a fourth theory which, though agreeing with the compartmental view in one of the main points in which it differs from the older doctrine—namely in considering that every proposition has (at least) *two* subjects, each term being the name of a "thing spoken about"—yet seems to me to differ from it fully as much as the predication-view and the class-view differ from each other. That theory, suggested in Mill's system,† stated very broadly by Mr. H. Spencer,‡ and more recently worked out into considerable detail by Mr. Carveth Read,§ may be described as the *relation*-view of propositions, and may be briefly explained as considering that every proposition really asserts the manner in which *two* 'nameable things' are related to each other; *e.g.* as resembling or differing, and to what extent; as successive or simultaneous in time, or conjoined in space, and whether invariably so or otherwise. For example, the most im-

* Chap. i.

† In spite of Mill's express adoption of the predication-theory (*System of Logic*, bk. i. ch. iv.), yet his whole view of 'connotation,' as also of causal sequence, was essentially that of a relation asserted between *two* Subjects.

‡ *Principles of Psychology*, part vi. chap. viii.

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portant assertions of succession in time are those of Causation,—the effect following its cause: again, descriptive assertions, and those which classify the S, may always be viewed as asserting the conjunction of attributes (in space or time or both),—as when the attribute 'fallibility' is said to be invariably conjoined with the other attributes common to human nature.

It is usual in Logic to divide what was above symbolised by J into (1) Copula, and (2) Predicate: and if it were possible to keep these names while avoiding ambiguity, I would gladly do so. But though 'Copula' might fairly be used to express 'relation asserted,' it seems impossible to divest the name 'Predicate' of its etymological associations, so as to view it as really the name of another 'thing spoken about.' We must therefore here adopt another symbol, and perhaps the letter $\mathfrak{S}$ is as little ambiguous as any. Under the relation-view then, the form of proposition would be, not S copula P, but S copula $\mathfrak{S}$.

In adopting the relation-view, however, it must by no means be supposed that we need therefore discard the traditional doctrine as erroneous. The predication-view is useful for many purposes, and perhaps its best practical excuse is that so often one of the two 'things spoken of' is more *directly* spoken of than the other. One of them forms the starting-point for the assertion, while the other forms its goal. Thus S may denote an observed or known event, and $\mathfrak{S}$ its supposed cause or effect; as in 'This death points to foul play,' or 'The war will disturb all

prices:' or S may be the name of something quite familiar, and $\mathfrak{S}$ one of its less obvious causes, consequences, or concomitants, or less familiar names; as in 'Tubercle is due to organic germs,' or 'Strikes are ruinous to the country,' or 'Gold has specific gravity 19·34,' or 'Whales are mammals.' Although, in short, every relation is, strictly speaking, two-sided, not every assertion is concerned equally about both its possible aspects. If S 'resembles' $\mathfrak{S}$, for example, it certainly cannot be denied that the latter also resembles the former, and yet our whole concern in making the assertion may be to bring the former just within the range of what we know (or suppose to be true) of the latter; our knowledge of $\mathfrak{S}$, as regards relation to a third term, Z, being in some way better established than our knowledge of S. Again, if S 'indicates' $\mathfrak{S}$, the latter 'is indicated by' the former; but the main purpose of indication is, of course, to point from sign to thing signified. The former is the starting-point and the latter the goal.

The relations that may exist between S and $\mathfrak{S}$, as thus understood, are of course extremely numerous. That is to say, we can, if for any purpose it be desirable, distinguish an endless number of them. S may, for instance, be the father of $\mathfrak{S}$, or his mother, child, wife, etc.; or larger than $\mathfrak{S}$, or less ambitious, or may live next door to $\mathfrak{S}$, or may be related to him, or her, or it, in a million different ways. For our purpose, however, it will fortunately be sufficient to make only the broadest

subdivision; and such subdivision will be the subject of the next following chapter. But first there is a preliminary source of difficulty to be cleared away.

III. SIMPLE AND COMPLEX PROPOSITIONS.

Such propositions as, 'All men are fallible,' or 'He is a man,' are somewhat unusually *simple*. That is to say, they are capable of being expressed in comparatively few words, without either circumlocution or intricacy. There are, indeed, other propositions still simpler, as 'He runs,' or 'I exist;'* but the majority in common use are of a much more complicated nature, each of the terms being frequently made up of a large number of words, or even of a combination of intricately interwoven clauses. This sentence just written, for example, is only moderately advanced in the scale of complexity, and yet considerably more so than 'All men are fallible:' any book or newspaper taken at hazard will immediately supply the reader with a dozen better instances. Simple propositions, of the type so familiar in logical text-books, are quite exceptional in real life.

From our point of view there is no firm line to be drawn between simple assertions and complex ones. That is to say, so soon as we distinguish the terms of any proposition, no matter how complex in verbal form,

* For the manner in which propositions asserting mere existence of the S may be viewed as stating a relation between *two* terms; see Bain's *Logic*, book i. chap. iii. § 23.

we thereby simplify it into *one assertion*. The mere fact that a given set of words can be viewed as comprising two assertions coupled by a 'conjunction,' does not necessarily prevent us from taking the two together and considering their joint intention. Still less, of course, do mere dependent clauses, or adjectival or adverbial limitations, destroy the unity of meaning. The commonest type, perhaps, among propositions is that where the terms each consist of some main constituent, limited or qualified in several ways. It is rarely that we have the opportunity of making a perfectly simple statement about a 'thing' which can be expressed by a perfectly unqualified name,—as 'man' or 'humanity:' we find it safer as a rule to confine the extent of our assertions somewhat, and thus we render them complex in form. There are comparatively few statements that we can make with any safety about 'All men,' except such as are already too familiar to be much required: but we may often find occasion to speak of 'All men who possess such and such a peculiarity,' or 'All except those who, etc.,' whereby our sentence becomes more complex and the assertion more limited in range.

It will not be necessary here to make any division of propositions in order to show the different kinds of complexity to which they are liable. Such a question is altogether more of grammatical interest than logical, and has certainly no importance for any purpose here undertaken. As will be seen later, we postulate agreement as to meaning, as a starting-point for Proof, declining all

invasion of the grammarian's province by any attempt to decide authoritatively what any given form or set of words shall imply. But it seemed necessary to make clear from the outset that the number of words, or of phrases anyhow combined, is, in our view, in itself no bar to the whole group being regarded as one assertion. Thus (*e.g.*) the complex assertion, 'He is fallible, for he is a man,' besides being capable of being viewed as *two* propositions set in relation to each other by a conjunctive particle, is also capable of being viewed as itself one whole proposition;* *i.e.* as being divisible into two terms set in relation to one another by means of a copula. But this will appear more clearly in due course.

* See also pp. 34, 100, 310, below.

CHAPTER III.

THE SUBJECT-MATTER OF PROOF: MAIN KINDS OF THESIS.

I. INDICATION.

THE most general of all relations, asserted or denied, is that which for want of a better name may in the meantime be called 'Indication.' The copula 'indicates,' as here understood, includes the copula 'is' (as in 'S is P'), stretching, however, beyond the usual interpretation of the latter. By calling this the most general relation it is meant that, with the one doubtful exception of the purely quantitative relations (the laws of which are amply developed in Mathematics, and require notice only in a more comprehensive scheme than can here be attempted), every proposition may be viewed as saying that one 'thing' indicates, or does not indicate, a certain other.

The apparent rashness of this statement will serve at least to show where the difficulty lies. Some word is wanted, for the purpose of generalising, in one expression, several kinds of assertion which are commonly described by different names; no word appears to me to be better

suited for the purpose than 'indicates,' and yet even this would certainly not be sufficient without some explanation. By means of the symbol $\longrightarrow$, indeed, it is possible to avoid ambiguity, but since the symbol must have a name we cannot altogether escape the use of language, and can only strive while using it to avoid any misleading associations.

For the purpose of dealing with the dangers of Proof, —including thereunder all dangers to which a thesis, or asserted judgment, is liable,—the most important fact about propositions seems to be the power which they give us (when their truth is believed) of passing from the known to the unknown. There are two distinct ways in which they may do this, one of which may be called 'implication,'* and the other 'material indication;' the former being the case where by merely analysing the *meaning* of a name or proposition we either arrive at or guarantee certain of its less obvious consequences; while 'indication' (in general) includes this case and also the commoner one where we obtain the same power, not by mere analysis of the meaning, but by viewing one fact as material evidence for another, —evidence asserted as strong enough to stand against all hostile criticism. The proposition 'Man is fallible' might be an instance of either of these modes of indica-

* *Cf.* Mr. H. MacColl, in *Mind*, No. xvii. p. 45. The difference between Mr. Mac Coll's view and mine appears to me far less important than the resemblance; and I trace much of my own view (and especially the 'law of counter-indication') jointly to the article quoted, and to Wundt's recent work (*Logik*, vol. i. *Erkenntnisslehre*).

tion, according as the notion 'fallibility' did or did not enter into the special meaning postulated for the name 'man.' If we pass to 'new knowledge'* by analysing the old, we do not reach a new theory, but the application of an old one: while the attempt to prove by way of implication is, of course, either to argue in a circle or to appeal *ad hominem*. Material indication is the sole means of really passing from unknown to 'theorised,' or from theorised to known,—so far as knowledge is capable of being guaranteed.

The chief difficulty about the name 'indication' consists in stretching it to cover the assertion of both Law and Fact; or, as such assertions will here be called, *Abstract* and *Concrete* propositions. It is easy enough to see how every *Law* asserted may be viewed as an indication, since the primary purpose of every law is, of course, to be interpreted, or applied: hence the S of every abstract proposition is expressed either directly as a 'general name' (simple or complex), or else,—and especially where such S is itself a proposition—is generalised by means of an 'if,' or 'where,' or 'when,' etc. But when we come to speak of concrete propositions, the word 'indicates' draws us at once into clumsiness of expression. This case of

* The question whether, by analysis merely, we can "increase our knowledge" is as ambiguous as the question whether by digestion we can "increase" the food we swallow. We do not increase its sum, or weight: we do increase its utility. We get a new and firmer grasp of old material. Though we may, of course, add to our power of applying knowledge, by analysing accepted truths, this merely points to the thoughtlessness with which we habitually bolt our axioms whole.

death, no doubt, may indicate (or point to) poison, or my pulse at the present moment may indicate (or show) the absence of fever, or yesterday's panic in the city may indicate (or foreshadow) a future increase of bankruptcy; but it is undoubtedly clumsy to say that Bavius 'indicates the qualities of' a fool: we habitually condense those four words into the one word 'is.'

Nevertheless, with this apology, I propose to use the name 'indicates' in default of a better to fit all cases. Much of the difficulty may be removed by remembering that it is only in abstract propositions that S is really a sign, in the ordinary sense of the term: it is only there at least, that it is intended to be *used* as a sign, or mark, or label, bearing a recognised meaning. The essential characteristic of concrete propositions is that their S cannot be said, *in general* (*i.e.* universally) to indicate the $\breve{S}$, except by virtue of all the special circumstances bound up along with the thing most prominently denoted there as 'S.' It may, indeed, be on general grounds only that we believe this or that concrete proposition,—as, that 'the panic will increase the number of failures:' but this does not appear in the statement. In the concrete proposition we distinctly assert the possession of something over and above mere general grounds, namely a full review of all the special circumstances. In spite of any hidden facts, we assert our judgment as deserving of belief.

The assertions which are thus to be included under the symbol $\longrightarrow$ (which may be read 'indicates') are

accordingly those of *Dependence* * (whether causal or logical) and of *Classification*. By an assertion of causal dependence is meant an assertion that two 'things,'—usually events, but sometimes objects or qualities,—are causally connected so that one of them is to some extent an indication of the other, whether a *sign* in the strict sense, or merely a symptom. Some 'things' in nature are found, or supposed, to be marks or signs of others, as a falling barometer indicates a coming storm, or as breathing indicates that life is not extinct, or as every existing human being indicates the prior existence of a pair of human parents. The statement of these indications may accordingly be written: 'Falling barometer ⟶ coming storm,' 'Breathing ⟶ presence of life' and 'Human being ⟶ prior human parents.' By an assertion of logical dependence is meant an assertion that the truth of one proposition 'follows from' that of another, or that the meaning of one name is included in that of another. Most names and propositions are intended to bear a meaning,—that is, to mark or signify notions or facts,—and some propositions are intentionally put forward as guaranteeing the truth of others. Thus the name 'Intolerance' may be intended to include the notion 'active hostility;' or the assertion 'He is coming,' the fact 'He is not here;' or again, the assertion 'He is a man' may be employed to guarantee the truth of the assertion 'He is fallible.' And these may respectively be written 'Intolerance ⟶

* *Cf.* Wundt. *Logik: Erkenntnisslehre*, pp. 179–186, 277, 281, etc.

active hostility,' 'He is coming ⟶ he is not here' (but of this the usual grammatical form would be 'If, or since, he is coming he is not here,') and 'He is a man ⟶ he is fallible' (or 'He is a man, and *therefore* he is fallible;' or 'He is fallible, *for* he is a man.') By an assertion of Classification is meant the extremely frequent cases where a 'thing' is said to deserve a certain name, or to bear 'essential resemblance' to another thing, or to belong to a certain class, or to possess a certain quality, or to have another thing 'coexisting' with it; as in 'Gold is an elementary substance,' or 'belongs to the class elements,' or 'The State essentially resembles a family,' or 'Every rose has its thorn' (or 'With every rose a thorn co-exists'); which may accordingly be written 'Gold ⟶ Element,' 'State ⟶ Family,' 'Rose ⟶ Thorn.'

II. AFFIRMATION AND DENIAL.

Indication may be either affirmed or denied. Certain propositions, instead of committing the assertor to any definite statement of the relation between S and $\mathfrak{S}$, are content to say merely that some definite assertion, taken as already made about them, is untrue. These will be called Denials: all others will be called positive Assertions, or 'Affirmations.'

It is a matter of some difficulty to mention any special grammatical form as fairly representative of the denial, since even sentences containing the negative particle 'not,' in close connexion with the verb, or the

quantification 'no' before a noun, or a 'negative name' as P (or $\mathfrak{P}$), are very frequently used to express a positive assertion as here defined. Thus we may say, 'That is not bad,' or 'No pen can attempt to describe the scene,' or 'He is unskilful, worthless, disagreeable, incompetent, etc.,' without at all attempting to confine ourselves to bare denial of something either actually or only presumably said before. The grammatical form of the proposition, though often useful as a hint towards the meaning in this respect, is at best an uncertain guide; nor can even the whole context be taken as in every case complete evidence of the real intention.

The two distinct intentions do, however, exist, and are to some extent inferrible from the words employed. Where the intention is doubtful, there is nothing to fall back upon except an express declaration by the speaker as to the sense in which the proposition is put forward. At present, however, we are not concerned with the means of arriving at the intention, but only with classifying those distinguishable meanings which have importance for the doctrine of Proof. Of these the most important is the distinction between positive assertion and bare denial. And having called attention to this fact, we may proceed at once to examine more in detail the manner in which this distinction runs across the others.

III. ABSTRACT AND CONCRETE PROPOSITIONS.

Next in importance is the opposition between Law and Fact asserted; or, as it may be otherwise called, between Abstract and Concrete propositions.*

The abstract proposition may be expressed indifferently in any one of various grammatical forms, of which perhaps the commonest are those familiar types (denoted under the traditional scheme by the letters A and E) whose S is the name of the members of a class, 'All' or 'None' of whom 'are' P. Thus, 'All men are fallible' (A), or 'No men are secure against fallacy' (E), are simple, straightforward examples of the assertive abstract proposition. In both cases the attribute 'humanity,' wherever found, is said to indicate the attribute 'liability to error.' Another common form which the abstract proposition takes, is where the S consists of what is sometimes loosely called an 'abstract name,' as 'honesty' or 'theft.' Thus, we might assert that 'Honesty is the best policy,' or that 'Theft cannot prosper long;' meaning, in the two cases respectively, something rather more clumsily expressible by 'Honest actions, in general, indicate success as likely to follow,' and 'Dishonest actions, in general, indicate that (in spite, it may be, of temporary success) ultimate failure is probable.' Of course, these and similar sentences may contain other meanings also—may even be used

* *Cf.* also "notional" and "real" propositions in Newman's *Grammar of Assent*, p. 7.

ironically,—but in so far as they are used to express the meaning explained, to that extent they are what we here call assertive (or affirmative) abstract propositions. Again, the adverbs 'always' and 'never' are very largely used to express the copula of assertive abstract indication, as in 'Bread always falls upon the buttered side,' or 'A story never loses by re-telling.' And again, another still commoner grammatical form in use is the conditional or hypothetical sentence, beginning with 'if,' or 'when,' or 'where,' or 'while,' etc.; as in 'If it rains in Ceylon, it pours,' or 'When poverty comes in at the door, love flies out of the window,' or 'Where there is smoke there is fire,' or 'While there is life, there is hope:' in each of these cases the purpose of the proposition may be to assert of one 'thing' that it universally indicates another, whether in the past, present, or future, relatively to itself. We need not at present follow these grammatical variations into further detail: enough has been said to illustrate them in a rough preliminary manner.

The concrete proposition, on the other hand, contents itself with a less (apparently) sweeping assertion. It says, not that S wherever found indicates $\mathfrak{S}$, but that in this particular instance it does so. Looking at all the circumstances the present dearness of money indicates a coming panic, the circumstances of this man's death point to some kind of poison, the latest political movement indicates dissension in the cabinet, or deserves the name of revolutionary or reactive, or whatever else it may be.

The difference is perhaps best expressible by saying that while in the abstract assertion S is spoken of (but by no means really *conceived*) apart from any circumstances which may serve to individualise it, in the concrete assertion the reverse is the case: we here say that *taking all special circumstances into account,* this S indicates $\mathfrak{S}$. It is true that to every concrete fact of causation there must correspond a law, if we can discover it; but, practically, most laws abstract more or less from the circumstances of the concrete.

Corresponding to abstract assertions there are abstract denials; and of these, two kinds may be distinguished. Sometimes we deny a law by asserting that there are exceptions to it; sometimes (*e.g.* frequently in classifying or name-giving propositions) by asserting that it totally fails; or, in other words, that 'some difference exists between S and $\mathfrak{S}$.' The former kind of denial may be called *exceptive;* the latter an *assertion of difference.* For the copula in exceptive propositions we shall henceforth use, on occasion, the symbol $+\!\!\rightarrow$, and for assertions of difference the symbol $\sim$.

As to exceptive denials, perhaps the most frequent grammatical form which these take is that known under the traditional arrangement as the 'particular'* pro-

* Cf. *Symbolic Logic,* chap. vii. p. 161. The particular proposition, as actually employed, no doubt serves several other purposes also, notably that of registering our first vague grounds of *Inference,* as contrasted with anything deserving the name of grounds of Proof. Finding two 'things' frequently or even occasionally conjoined, we often begin to get upon the track of some law, and eventually we may rise thereby to

position (I or O): *e.g.* 'Some negroes are fairly intelligent,' or 'Some Mexicans are not habitual liars.' Again, the adverbs 'sometimes' or 'sometimes not' are frequently used in exceptive denials; and again the expressions '$\mathfrak{S}$ is quite compatible with S,' or 'S is by no means necessarily $\mathfrak{S}$;' and again, the expression 'all . . . are not,' as in 'All that glitters is not gold,' and various other forms, such as, for example, 'There are lawyers *and* lawyers.' Here also no form of words is by itself perfectly unambiguous: we need something else to show whether the proposition is really intended as assertive or as a bare denial. But on the whole, and roughly, the particular proposition may be taken as most nearly typical of this class. No useful distribution of any proposition into its component parts, it must be remembered, can ever be made until the real intention of the speaker is clear.

As to 'assertions of difference,' there is some difficulty, as the name chosen may help to show, in placing them quite clearly in the class of mere denials. The justification for doing so lies, however, in the fact that without some supposed belief that, for the purpose in hand, no difference exists (*i.e.* that S $\longrightarrow$ $\mathfrak{S}$) the assertion of difference is too trivial to have any practical value, since points of difference may always be found between two things, however nearly alike. Hence the

the power of making, and perhaps proving, some abstract assertion regarding them. But, regarded as positive assertion, this is too vague to be called a 'thesis.'

essential purpose of these assertions is to *contradict* something already supposed to be believed. The sole practical use of the assertion of difference is either to break down a supposed analogy or to deny the applicability of a name, *i.e.* the right of a 'thing' to belong to a certain class; and this whether the proposition be abstract or concrete. Thus we might say 'National Government is a different thing from family government' (abstract), or 'Whales are not fishes' (abstract), or 'The Kilmainham arrangement was not a compact' (concrete), or 'The case of Mr. A. is different from that of Mr. B.' (concrete). These propositions merely say that S *differs from* $\breve{S}$. For further examples of this form of denial we may take such expressions as 'Seeing is a very different thing from believing,' or 'Liberty is one thing and License quite another,' or even perhaps 'Force is no remedy'; though this last phrase has no doubt been more often used to express a vague law that 'Force $\longrightarrow$ probable continuance of the evil' than merely to deny an assertion to the contrary or to correct the use of a name. As this last example may serve to show, there is sometimes a difficulty in deciding whether a given sentence is really an assertion that S indicates the *absence* of something (as ice, for instance, indicates the absence of a certain degree of heat), or a mere assertion of difference between S and $\breve{S}$. But this is a difficulty which cannot be remedied by simply refusing to notice it. The possibility of misunderstanding the real intention of a given set of words, is one that can hardly too often be brought to mind.

Corresponding to concrete assertions there are concrete denials; and of these again two kinds. We have already spoken, just above, of the concrete assertion of difference, and after what has been said of assertions of difference in general, the nature of the first kind of concrete denial will be sufficiently clear. Nor is there much difficulty as to the other kind of concrete denial. It follows from the nature of concrete assertion that these cannot be at all described as 'exceptive,' since there is no law to which they directly take exception. Perhaps the best name for them is 'Simple denials.' These also are found in various grammatical forms, but the commonest is, no doubt, where 'not' is added to the verb, as in 'This was not due to drink,' 'The crisis will not be followed by any important change,' 'It is not accompanied by much danger, after all,' etc. Also in this sense a negative name as $\mathfrak{S}$ may be sometimes used, though perhaps rarely. Thus in saying 'The door is unfastened,' we might conceivably intend merely to deny the opposite assertion, but more probably the intention would be to convey a positive assertion of our own. When once the distinction between concrete and abstract propositions is clearly kept in view it becomes sufficiently easy to recognize the simple concrete denial.

The abstract proposition is, then, the assertion or denial of any general law in Nature, of however narrow sweep or insecure stability: the concrete proposition is the assertion or denial of a single fact. The concrete proposition takes a concrete S, 'this man,' 'these

instances,' 'my lecture yesterday,' 'your hope of success' and tells us what these 'indicate,' forwards in time, or backwards, or contemporaneously. And here must be noticed an objection which may possibly be raised at first sight to this use of the word 'concrete.' A man, it may be said, is clearly concrete enough, and so perhaps is an instance; but a lecture, is not that dangerously near the abstract? And 'Hope,' 'Success,' are not these purely abstract terms? The answer is that no word (when used in a proposition—and it is only when so used that we are here concerned with words) is in itself either abstract or concrete, but its context makes it so. Any word may be either, according to the purposes of our assertion. We may speak of 'man' or of 'men' in the abstract, in spite of the solid flesh belonging to each individual; and on the other hand, by hedging in a so-called 'abstract name,' with the help of a demonstrative pronoun, or in whatever way the resources of language will allow us to apply such name to some actual concrete case, we destroy for the time its abstract nature, and the proposition as a whole becomes concrete. If I make an assertion regarding the 'truth' of some particular story, I state no law, and deny no law, but confine my remarks to one particular concrete fact. The underlying meaning of 'abstract' is always 'detached from special circumstances,' or 'generalised;' and so long ago as Berkeley's time our limitations in *conceiving* (or having a definite idea of) anything in the abstract have been clearly shown. We cannot conceive things in the abstract, but

we can make abstract assertions regarding them;—can sometimes say, that is, how they will behave or how they should be explained or designated under all circumstances indifferently; and where we speak of *this* man, *your* hope, etc., we include special circumstances which 'man' and 'hope' by themselves would lack. In the concrete proposition we sum up the *total* circumstances, taking (or rather professing to take) all the individual peculiarities of the case into consideration before pronouncing judgment. Whether or not 'hope' in the abstract may tell flattering tales habitually, we say that taking all the present circumstances into account it does so here. The S of a concrete proposition differs from that of the corresponding abstract one in being saddled with all the individual peculiarities of the given case. And on this account the concrete assertion differs from the abstract one in being less easy to disprove; since the 'circumstances' are nearly always wide enough to contain something that even science fails to reckon.

It must now be sufficiently evident also that so long as the meaning is clear, the grammatical form of the sentence—categorical or hypothetical, simple or complex, A or E, etc.—is not of the slightest importance. The proposition, for instance, 'Murder will out,' is, for purposes of proof, the same whether expressed in this fashion or in the shape 'All murders are eventually discovered,' or 'No murders remain undiscovered,' or 'Murder always comes to light,' or 'Murders never remain hidden,' or 'When (or if) murder is committed,

detection is sure to follow,' or in whatever way it may suggest itself to rhetorical ingenuity to clothe the same meaning. At the root of all abstract propositions lies the formula—

$$S \text{ (universally)} \longrightarrow \mathfrak{S}$$

and this whether $\mathfrak{S}$ be past, present, or future relatively to S and whether the name of either be positive or negative. In each case S (in general) is said to be a sign, or mark, of $\mathfrak{S}$, whether in the past, present, or future, relatively to itself. Where S is found, $\mathfrak{S}$ (it is asserted) may be looked for.

Abstract propositions play an important part in proof,—whether proof of other abstract propositions or of concrete ones. They summarise, in a compact and convenient form, whatever general knowledge of nature we have already obtained, and serve as tests to which to bring any new assertion propounded for proof. The establishment of these is of course the centre of interest for science. It is through the existence of such 'dependences' that all explanation and prediction become possible, and our consistent recognition of them constitutes the main difference between our conception of Nature as a network of uniformities, and the earlier notion, so inevitable to savages, of a world governed by caprice or luck.

Concrete propositions, on the other hand, although constituting in one sense the foundation for science, find their main interest, as subject-matter for proof, in a less exalted region. Although in common life also the truth

of general laws (more or less vague perhaps in their statement) may to no small extent be debated, yet the bulk of the questions arising there for settlement are of a concrete character; and, roughly speaking, the commoner the life the more relatively frequent are the concrete assertions put forward. Whether this or that thing, person, or definite group, did act in such and such a manner, or does possess such and such qualities; whether this or that individual action, event, or 'accident' was due to such and such causes, or will have such and such results; these are the most frequent questions about which in daily life doubt arises, and which press for settlement and proof. Every one of these is concrete,—an assertion directly regarding individual fact, not general law,—and as such is marked off by a chasm as wide as any that can be made in Logic, from the propositions above defined as abstract. Between concrete and abstract knowledge, however, with respect to their attainment and growth, there has been mutual aid and mutual criticism so far back as can be traced at all. No doubt, in one sense, concrete knowledge (or something separated from 'knowledge' only by imperceptible degrees) is earlier in time, just as common life is earlier than Science. But in both there are now innumerable shades of development or completeness. It may be safe to say, perhaps, that from crude concrete perceptions the first predisposition for abstract knowledge arose, and that by means of such predisposition, aided by language, or signs, the first crude abstract guesses were formed.

But the history of knowledge, from the earliest evidence attainable, is a record of the alternate and mutual production, correction, and illumination, of one kind of judgment by the other. At the present stage of progress, as will be seen in speaking of the kinds of Proof, there are thus in operation two somewhat conflicting methods of testing truth,—two methods which, though often opposed as rivals, and either of which may at times become unimportant or inapplicable, are yet to a great extent capable of being employed in one and the same investigation. Our theories require to be grounded on facts, and also to be confronted with them: but to see our facts in the light of theory, though a dangerous habit, is in some ways a useful one. No practical mind can desire wholly to dispense with the formulated results of all past observation. Nor, perhaps, could such a desire be really satisfied: it is difficult to find a single case of observation that is quite free from the influence of our general knowledge. Whatever may be true of the earliest concrete assertions, at the present time every concrete assertion put forward as a thesis carries with it a remote and indirect reference to numerous 'laws' assumed. By implication it declares the possession not only of some one piece of abstract knowledge but of many; it professes the knowledge not only of a law but of conflicting tendencies, by means of which the special circumstances can be allowed for and a total balance struck. Thus the concrete proposition (when so far developed as to become a thesis for proof) is

always full of abstract propositions unexpressed. Somewhat as the trained ear can detect the overtones in a musical sound, the logical mind detects the hidden assumptions in a concrete proposition. The abstract proposition also certainly professes an acquaintance with concrete facts, but not quite in the same manner as the concrete proposition professes a knowledge of the laws of Nature as bearing on the special circumstances of the case under consideration; for since the abstract proposition expressly avoids saying anything about special circumstances, the assertion made is almost infinitely simpler. Practically, of course, the 'overtones' in a concrete proposition are mostly overlooked, but it is their existence that constitutes the chief weakness of unaided common-sense. What seems to common sense more indisputable than that this given action is a case of 'firmness' or 'strength of character,' or 'courage?' Perhaps a deeper insight would show that among the special circumstances must be included ignorance of conflicting claims, or ignorance of danger.

There still remains to be noticed that very common form of proposition which, when two concrete things are already *given* as having occurred or as existing successively or simultaneously, asserts causal connexion between them. When we say, for instance, 'Your hasty speech was the cause of all the disturbance,' or, 'It is this pillar that supports the building,' is the assertion properly abstract, as implying some law, or concrete, inasmuch as it speaks directly and expressly

of individual facts? Such propositions, I hold, may be used for either purpose, or for both together. It is difficult to say for which they are most often applied, or even which is most often their primary meaning. On the whole one would perhaps be inclined to call their concrete meaning primary, and to say that the abstract meaning was rather insinuated, or implied, than directly intended as an assertion. But in practice it will be found that these assertions are largely used for apparently confirming, by means of facts experienced, causal *laws* already more than half believed. And since the abstract meaning has a wider importance, and since moreover if the assertions be true in the concrete there must also be some true abstract assertion behind them, it seems best to view them as capable of both a concrete and an abstract meaning, the disproval of either of which would disprove both. For convenience, then, we may speak of these as Abstract-Concrete propositions, if it be clearly understood that they form no new distinction in kinds of meaning, nor interfere with the division already made (of meanings, not of forms of words) into abstract and concrete.

At the end of the book (Appendix E) will be found a table (I.) of the divisions thus far made.

IV. SUCCESSION AND CO-EXISTENCE.

There are not many minor distinctions of meaning in propositions that call for notice here. We are not in

search of all the varieties that can possibly be distinguished, nor even of such as may be on the whole the most important for general purposes, but only of such as have special interest for the purpose of discussing the methods and the dangers of Proof.

It seems necessary, however, to mention briefly the distinction between propositions asserting succession (whether backwards or forwards in time) and those asserting co-existence; or, as they are more commonly called, assertions regarding Causation, or Causal sequence, and assertions which merely *name*, or classify, the S, or which state some of its constant concomitants without necessarily attempting to trace them to a parent cause. Such importance as the distinction has, for us, flows from the fact that according to the nature of the assertion in this respect is to some extent its liability to special dangers.

Wherever indication is asserted, whether in abstract or in concrete propositions, all importance turns, of course, on the degree of trustworthiness of the sign:* some signs being more certain than others, but even a vague symptom being better than none at all. And according as the assertion points backwards or forwards in time (S a sequent of $\mathfrak{S}$, as in 'Valleys $\longrightarrow$ prior denudation;' or S an antecedent of $\mathfrak{S}$, as in 'Deficient education $\longrightarrow$ future increase of crime') is it to some extent open to

* We must here use 'sign' in an extended meaning also, to correspond to 'indication:' so as to say that in *every* proposition, abstract or concrete, S is the 'sign,' and $\mathfrak{S}$ the thing signified, or 'signification.'

special and different dangers: propositions pointing backwards being liable to the danger of overlooking 'Plurality* of Causes;' and propositions pointing forwards, to that of overlooking the liability of one cause to be counteracted by another.

Thus, to take first Abstract assertions: it is seldom we can say that any given S invariably indicates the past existence of any given 𝔖,—unless, indeed, the 𝔖 employed be so vaguely defined as to be of very little practical service. Every event (S) we may no doubt assert, within the widest empirical limits, indicates the past occurrence of *some* other event, the essential part of which recurring, S will recur: true, but we do not often find this doubted. The point of practical importance is, *what* prior events does S indicate. Or, again, every existing human being has certainly had (*i.e.* indicates the prior existence of) a human grandfather: this also is too axiomatic to convey practical information, though we may want to know the name or the special characteristics of the grandfather in question. Almost, but not quite, equally rare is it to find complete invariability of sequence asserted, except thus vaguely, when the refer-

* Mr. Carveth Read's term, 'Vicariousness' of Causes, though less ambiguous, I only do not use because the name 'Plurality' appears to be so firmly established, and need not really mislead. The reader to whom the phrase is unfamiliar must notice that what is meant is the possibility of *any one of several* causes having produced the 'same' effect, as where 'one kind' of death may be due to heart-disease, or to a fever, or to yet other alternatives; the name has nothing to do with the *combination* of causes, as where a death is due to mental anxiety, *plus* insufficient food, *plus* an illness not otherwise necessarily fatal.

ence is forward in time. A shot through the heart or brain is perhaps invariably followed by death, and if there were interval enough between the two events we should say the former indicates the latter as sure to happen: but favourable seed-time does not necessarily indicate abundant harvest, since in the interval some unforeseen counteraction may arise, or at the seed-time itself along with certain favourable conditions there may have been an unsuspected enemy sowing tares. So again, we may often predict too vaguely to be of much real service. Sunshine, we know, for instance, always follows rain, and may be expected sooner or later; but what we most want to know is *when* to hope for it, or under what exact conditions, if within our power to compass.

Accordingly, abstract assertions of succession are commonly made with a large margin for the incalculable. We feel fairly contented in obtaining any hint of 'law'—any knowledge, that is, which may form a basis for even imperfectly secure inference and proof. The only alternative to 'Chance'* is often 'Tendency,' and in our gladness to escape from Chance we dignify this as 'Law.' An abstract assertion pointing backwards has, then, to deduct from the trustworthiness of its asserted indication in order to allow for the possibility of 'other causes producing the same effect;' and this even where

* By 'chance' is meant in this connexion no more than the contradictory opposite of 'known law.' Some law there is nowadays always assumed to be, but that the conjunction is due to chance means really that no amount of limitation of S or of $\bar{S}$ will give us a known law between the two things so designated. See also Appendix D.

we possess a real 'Causal Law.' It is a real law, for example, that prolonged starvation invariably causes death. But still we are very far from being able to say that death, wherever found, indicates prolonged starvation. And in like manner every abstract assertion pointing forwards in time has, almost in proportion to its definiteness and consequent practical value, to allow for possible antidotes or counteraction.

In abstract assertions of co-existence, we can often attain greater certainty of indication (for practical purposes, at least, and within narrow fields), but even here large use is made gratefully of incomplete laws—indications only roughly trustworthy, true only on unexpressed conditions. We may know, for instance, that boys 'as a rule,' delight in mischief, and we may make real use of the knowledge, without being at all able to generalise the exceptions so as to state a quite invariable law. If we could truly say, *e.g.* 'All boys except those who are physically deformed are mischievous,' our indication would be of far greater value than while we can only say 'the majority,' or 'many,' or 'the average boy,' or any other vague limitation.

In the concrete proposition, on the other hand (except, as will be presently seen, in the case where S is said to *deserve the name* $\mathfrak{S}$), there can be no talk of the assertion being roughly true. The given S was either as a fact preceded by $\mathfrak{S}$ or not; $\mathfrak{S}$ either will or will not be among its consequents in time. Here, accordingly, it becomes still more important to recognise the Plurality

of Causes and their liability to counteraction; and hence the purpose of distinguishing the two kinds of assertion, namely those with a backward and those with a forward reference,—assertions explanatory or detective, and those which predict. As regards the descriptive or classifying proposition (where S is said to deserve the name S) here a little more latitude seems inevitable. Names are altogether so loosely applied—their correct meaning varies habitually within such wide limits,—that in giving S a name not already assumed to belong to it of right, we may well be content, in many cases, to come somewhere near the mark. Is this man civilized, intelligent, learned, unsteady, idle, brave? Even when we judge his character accurately in *fact*, very many of such questions might admit of the double answer, Yes and No.*

As, then, in the case of explanatory or detective propositions the main difficulty flows from the Plurality of Causes, and in predictive propositions from the liability of one cause to be 'counteracted' by others; so in propositions of co-existence the danger is that of taking for 'essential' something that is 'accidental' merely,—*i.e.* of believing 'always' when the real truth is 'sometimes.' For if the proposition be concrete (as, 'This man is a fool') it still professes abstract knowledge,—knowledge of the essential qualities which go to form the meaning of the predicate in question.

Tables II. and III., in Appendix E, show concisely the results of this section.

* See also pp. 124, 133, 184, 189, *inf.*

CHAPTER IV.

THE LAW OF COUNTER-INDICATION.

As the presence of one thing may indicate the presence of another, so may presence indicate absence, or absence indicate presence, or absence indicate absence. All these are, of course, equally assertions of indication. Thus a negro's coloured skin may be asserted to indicate the presence of a cheerful temperament, or the absence of some other qualities; and the absence of pain, in certain cases, to indicate the presence of paralysis, or the absence of inflammation.

On any view of Logic, the real *pons asinorum* is the group of facts here to be generalised under the one 'Law of Counter-indication.'* This law may be said to lie directly at the root of the ordinary doctrines of conversion and contraposition, and also to contain an explanation of the whole syllogistic process. Difficult

* Mr. MacColl, who formulates essentially the same law, adopts for it the name *contraposition*. But contraposition, in its usual meaning, seems never to have had quite so wide an application, and therefore I prefer 'counter-indication' as less likely to mislead. *Cf.* also Prof Croom Robertson's remarks, in *Mind*, No. i. p. 148.

though it is to state the law in perspicuous language, and intricate though some of its consequences may be, the principle itself is really extremely simple, and, once grasped, can hardly be forgotten afterwards. It needs, however, some special definition in order to overcome in the first place the difficulties of statement.

The words 'presence' and 'absence' are until further explained, hardly general enough to express all that is intended, and are only chosen because no other, more comprehensive, names appear to be available. The presence or the existence of a thing or quality, the happening of an event, the truth of an assertion, stand on one side of the opposition intended, as contrasted with the absence or the non-existence of a thing or quality, the non-happening of an event, the untruth of an assertion. And for brevity and our own convenience merely, I wish to extend the use of the two terms chosen, in order to cover these diverse meanings. Accordingly such assertions as that 'human beings ⟶ human parents,' or that 'the existence of discontent in India ⟶ bad government,' or that 'the falling of a stone ⟶ the force of gravity,' or, 'If he is well he will certainly go,' etc., are all cases of 'presence' indicating 'presence' in the sense intended. And so with the indication of absence by presence, and of presence or absence by absence. The two words are not to be understood as strictly limited to their ordinary sense, but as stretched to include the wider meaning postulated as above for the sake of simplifying the expression.

Now, since we mean by S the whole of that 'thing' which constitutes the sign or *datum*, and by $\mathfrak{S}$ the whole of that which the sign signifies, it is clear that if we employ symbols to express respectively that thing the *presence or absence* of which may indicate $\mathfrak{S}$, and that thing the presence or absence of which may be indicated by S, we cannot use S and $\mathfrak{S}$ themselves for such a purpose without incurring misinterpretations. Instead of them it would be better, where necessary, to use the corresponding small letters *s* and $\mathfrak{s}$. Thus, if the presence of a steady pulse $\longrightarrow$ absence of fever, 'steady pulse' and 'fever' are respectively *s* and $\mathfrak{s}$, 'the presence of a steady pulse' is S, and 'the absence of fever' is $\mathfrak{S}$. Finally, if we call that S or $\mathfrak{S}$ which expresses the 'presence' of *s* or $\mathfrak{s}$, a *positive* one; and that which expresses their 'absence' a *negative* one; and if we call their positiveness or negativeness their *quality;* and the change from positive to negative, or from negative to positive, a *change of quality;* the law may be stated as follows:—

All indication of $\mathfrak{S}$ *by S (affirmed or denied) is expressible as indication of S by* $\mathfrak{S}$ *(affirmed or denied), if, and only if, the quality of both S and* $\mathfrak{S}$ *be changed.*

Let us trace the operation of this law, first symbolically and afterwards by means of examples. And for the symbolical expression let S and $\mathfrak{S}$ stand for the positive forms, and non-S and non-$\mathfrak{S}$ for the negative ones. Then the sole equivalent of

(1)	S → $\mathfrak{S}$	is	non-$\mathfrak{S}$ → non-S	(*cf.* contraposition of A).*
(2)	S → non-$\mathfrak{S}$	„	$\mathfrak{S}$ → non-S	(*cf.* simple conversion of E).*
(3)	non-S → $\mathfrak{S}$	„	non-$\mathfrak{S}$ → S	(*cf.* exclusive disjunction).*
(4)	non-S → non-$\mathfrak{S}$	„	$\mathfrak{S}$ → S	(*cf.* No. 1, above).

and the sole equivalent of

(5)	S ↛ $\mathfrak{S}$	is	non-$\mathfrak{S}$ ↛ non-S	(*cf.* contraposition of O).*
(6)	S ↛ non-$\mathfrak{S}$	„	$\mathfrak{S}$ ↛ non-S	(*cf.* simple conversion of I).*
(7)	non-S ↛ $\mathfrak{S}$	„	non-$\mathfrak{S}$ ↛ S	(*cf.* No. 3, above).
(8)	non-S ↛ non-$\mathfrak{S}$	„	$\mathfrak{S}$ ↛ S	(*cf.* No. 5, above).

But examples will perhaps show the process more clearly. Take first the assertion that "every corrupt tree bringeth forth evil fruit" (*i.e.* presence of corruption in the tree ⟶ ditto in the fruit); then the equivalent form of this, and the sole *indication* implied, would be 'absence of corruption in the fruit ⟶ absence of corruption in the tree' (*i.e.* 'if the fruit is sound, the tree is sound'). What the proposition does *not* tell us, but what may perhaps be known to be true from other sources, is, either that corruption in the fruit indicates corruption in the tree (*i.e.* "every tree that bringeth forth evil fruit is corrupt"),—which would be the 'simple converse' of the original proposition,—or that

* These names refer to some of the ordinary technicalities of Logic. They are well explained in all the text-books; *e.g.* Bain's *Deduction*, pp. 113–116, 122.

soundness in the tree indicates soundness in the fruit—which would be the 'reciprocal.' From the original proposition, we can indeed get the *denial* of any such law, as that corruption in the fruit indicates soundness in the tree (*i.e.* 'Some corrupt fruit is the offspring of a corrupt tree;' the 'converse *per accidens*'); but this, being a denial, is not itself a statement of indication: the sole indication is that which in the A and O propositions is usually called the 'contrapositive,' in the I and E propositions the 'simple converse,' and which in all propositions is here called the counter-equivalent.

Or take (2) the assertion that 'no quakers are dishonest' (quaker tenets ⟶ absence of dishonesty.) Of this the formal equivalent would be that dishonesty ⟶ absence of quaker tenets ('No thieves are quakers'). Here will at once be recognised the ordinary simple converse of E, our rule differing, in fact, from such conversion only in being applicable more generally, so as to include *all* grammatical forms of proposition, so long as they express the indication of non-$\mathfrak{S}$. Thus from the conditional sentence, 'If it be true that he has come, then it must be false that he has broken his leg;' we get by counter-indication, 'If it be true that he has broken his leg, then it must be false that he has arrived.' Again, from (3) "He that is not with us is against us" (or 'Everyone is either with us or against us,' or 'All except our party are unfriendly') we get by counter-indication some proposition meaning that all except the plainly hostile are on our side; and if the proposition

should prove untrue in one of its aspects it must be untrue in the other also. This form of proposition deserves more attention in Logic than it sometimes obtains, and we shall presently (p. 92) have to devote a few words of special notice to it. It is perhaps more liable to misinterpretation in respect of its legitimate counter, than any of the other forms.*

The importance of the Law of Counter-indication is far-reaching in Logic. But so far as relates to the interpretation merely of the meaning of assertions it may be shortly stated. A certain proportion of indications there are—a comparatively small proportion, however—which really 'cut both ways,' or, as it is technically called, allow of the 'reciprocal'† assertion also. Thus,

* As examples of the remaining forms may be given: from (4) 'without trouble there can be no success,' 'the attainment of success shows that trouble has been taken:' from (5) 'typhoid fever does not necessarily show that there has been defective drainage,' 'proper drainage is no complete safeguard against typhoid fever:' from (6) "the presence of the attribute 'habitual tendency to drunkenness' does not necessarily show the absence of (or 'is compatible with') a fair amount of industry" 'the presence of a fair amount of industry does not necessarily show the absence of a tendency to drunkenness' (or, from 'some habitual drunkards are fairly industrious' 'some fairly industrious men are habitual drunkards'): from (7) 'absence of the power of discrimination does not necessarily mean presence of the power to generalise,' 'absence of the power to generalise does not necessarily indicate presence of the power to discriminate:' from (8) 'illness does not necessarily mean weakness,' 'strength does not necessarily mean health.'

† The name 'reciprocal' will be here slightly extended beyond the ordinary usage, and employed to mean not only what Prof. Bain calls (*Logic*, vol. i. p. 111) the "material obverse," but also the illegitimate *converse* of any indication (affirmed or denied); *i.e.* the converse formed without changing the quality of S and $\bar{S}$. Thus, both 'non-S $\rightarrow$ non-$\bar{S}$'

evil fruit does perhaps, as a fact, indicate an evil tree. So again, while a certain label on a bottle shows that it came from a certain firm (S indicates $\mathfrak{S}$), we are also often told, in the same breath, that "without such label, none are genuine" (non-S indicates non-$\mathfrak{S}$); and while equilateral triangles are equiangular, equiangular triangles are equilateral. From these and similar occasional cases a certain looseness has affected our application of all words expressing indication (the word 'indication' itself seems to me least ambiguous of any) through which its essential one-sidedness comes into frequent danger of being forgotten. The law of counter-indication helps to remind us that sign and signification are not quite identical.

Here should be noticed further a fact which interferes largely with what may be called the *positive* utility of the law,—the fact, namely, that *s* is so often a mark whose presence or absence is much easier to recognise than that of $\mathfrak{s}$. When Darwin finds, for example, that white cats, with blue eyes, are always deaf, the counter equivalent (absence of deafness, in cats, $\longrightarrow$ non-whiteness of fur or non-blueness of eyes) is hardly likely ever to be *used* as a direct indication. If we want to discover the colour of a given cat's eyes, we should probably use our own, by way of direct observation, rather than employ a series of experiments upon the cat's power of

and '$\mathfrak{S} \longrightarrow$ S' would be forms of the 'reciprocal' of '$S \longrightarrow \mathfrak{S}$.' See also Wundt's remarks on 'one-sided' and 'mutual' dependence in general; *Logik* (*Erkenntnisslehre*), pp. 214, 245, 317, etc.

hearing. And so in many other cases. The chief value of the law is rather restrictive than inferential,—namely to prevent our supposing the reciprocal necessarily true.

Readiness to accept the reciprocal as equivalent, is one of the strongest tendencies in uninstructed human nature. Recognising, for instance, the rough truth of the law that stupid people are conservative, the superficial reasoner is apt to overlook the difference between this assertion, and that 'to be conservative $\longrightarrow$ stupidity;' assuming that success in examinations is a good indication of hard work and high talents, common sense supposes that this assertion really *means* that failure in examinations is a good indication of idleness or incompetence; only with great difficulty can the illogical mind be made to see that other causes of such failure can possibly exist besides the one or two most superficial or striking; and when the plurality of causes is at last recognised here, it seems to shake some people's faith in the positive indication also. Professor Jevons, speaking with a wide knowledge of students' capabilities, tells precisely the same tale. "A man," he says, "who is very ready at integration begins to hesitate and flounder when he is asked such a simple question as the following: 'If all triangles are plane figures, what information, if any, does this proposition give us concerning things which are not triangles?'" To some extent also, and chiefly where symbols are employed, no doubt the error flows from a mere thoughtless inclination for balance, or antithesis, or symmetry. Those who are just

beginning the study of Logic are perhaps especially apt to be slaves to this inclination. De Morgan notices (and Jevons endorses the opinion) that the average beginner, when asked what follows from 'Every A is B,' invariably and promptly answers, 'Every B is A *of course*.' One cannot help feeling that the cause is in such cases probably not very deep; the schoolboy who, being told that the three sides of a certain triangle were equal, triumphantly inferred that the fourth side must be equal too, hardly supplies a better instance of simple want of thought.

Most of all, perhaps, in interpreting the thoroughly 'disjunctive' proposition (where absence is asserted to indicate presence), this spirit of superficiality may be seen in harmful operation. That is to say, a disjunction is relied upon as exhaustive while it is thought sufficient to prove the mere assertion of difference. Thus 'Conservative' and 'Liberal' are certainly *different*, but it does not follow that they are the only two alternatives. The counter-equivalent of 'non-S $\longrightarrow$ $\mathfrak{S}$' is, as shown above, 'non-$\mathfrak{S}$ $\longrightarrow$ S,' but what is thus wrongly taken as equivalent is '$\mathfrak{S}$ $\longrightarrow$ non-S,'—a proposition almost always far easier to prove.

For when we say that "If *not* s, then $\mathfrak{s}$" we make a large assertion. We divide, in fact, the whole universe into two classes, s and $\mathfrak{s}$, and boldly assert that nothing else but these exists,—that whatever is not in the one class must be in the other. Now, to do this with s and not-s, or with $\mathfrak{s}$ and not-$\mathfrak{s}$, is a matter of common occurrence;

so common, in fact, that whenever we use a general name we tacitly accept thus much responsibility. But in such cases the only difficulty is as to the position of the dividing line, not as to the outer limits of the field that may lie beyond it: 'not-s,' or 'not-$\breve{s}$' does not bind us to specify otherwise than quite vaguely the things that lie outside our defining fortification.

When, however, we go further and say, 'I know a positive name for the whole class, not-s (*e.g.* 'not-conservative'), and that name is $\breve{s}$,' (*e.g.* 'liberal') we really profess to have looked out from the citadel s, and to have scanned the universe therefrom. Of course there are cases where, owing to special circumstances (*e.g.* artificial limitation of the 'universe,' * or again, the case where s occupies a larger extent than not-s) this is practically possible. It needs little courage to assert that all the contents of my pocket are either letters or post-cards, or that if a man does *not* believe the earth is round, he must be slightly crazy. But there are many more cases where we are apt mistakenly to suppose the universe scanned; and this danger is immensely increased if we are careless enough to suppose that it is 'the same thing' (or even 'practically' the same thing) to prove the reciprocal.

* De Morgan was, I believe, the first to observe that behind most assertions there is an unexpressed limitation of the range of their extent. There is a 'universe of Discourse' beyond which the assertion is not intended to apply. 'Not-white,' for example, is predicable solely within the universe 'colour;' and 'Nonconformist' excludes, by custom, heathens and atheists, as well as those who conform.

But mere thoughtlessness is, no doubt, not the only explanation of the tendency in question. The deepest source of it seems to be the fact that provisional belief in the reciprocity of indications is so often fruitful as regards the earliest guesses at unknown truth; for though $\mathfrak{S}$ (or non-S) may not exactly indicate S (or non-$\mathfrak{S}$), it is often so closely connected with it by causation that in finding where such indication fails we hit upon the real law. Corruption in the fruit, for example, may *except in certain assignable cases* indicate corruption in the tree. Nevertheless, in Proof as distinct from Discovery, the tendency is fatal, and needs to be held in severest check. It is unsafe even to suppose, as seems so natural, that mutual indication is the rule, and one-sided indication the exception. Probably the prevailing attitude among the illogical is best expressed as the belief that any law, in the absence of proof to the contrary, involves a 'fair presumption,' at least, that the reciprocal is true; while fair presumption is not worth distinguishing from 'practical certainty:' the real fact being that the most an abstract indication ever involves is a fair presumption (and that not always) that the reciprocal is worth the labour of investigation. But it seems unnecessary to say more about the practical value of the law of counter-indication: it merely binds up into one scheme rules whose utility is already well-known. This is the case, at least, as regards the universal affirmative and the particular negative: perhaps, however, the ease with which the disjunctive proposition is liable to

be taken for the mere assertion of difference, may be a less familiar fact.

It remains to ask how far the law is applicable to concrete propositions. The answer seems to be that, though formally implied, the counter-equivalent is in concrete propositions never directly needed. This is in fact the extreme case of what was noticed in the example of the blue-eyed cats. If s be a concrete 'thing,' we have other marks, more readily applicable than non-$\breve{S}$, by which to prove its absence: it is in fact known to us mainly by means of its attendant circumstances as a whole; and S is only one of these, and (by hypothesis) not the most familiar. We can, indeed, apply counter-indication to concrete matter in some such way as this: suppose the concrete proposition to be 'This murder $\longrightarrow$ greed of gold;' if we are certain of this, and also of the fact that in a given prisoner's case the greed of gold was absent (non-$\breve{S}$), we no doubt may infer that this murder was not (non-S) committed by him. But here, of course, it is not 'this murder' whose existence we get denied, but the truth of the theory that it indicates the prisoner as its cause: it seems that the result is obtained circuitously, by means of the abstract indication involved,—namely '*Any one* who committed this murder must have had a greed of gold,' or 'The abstract possibility of this murder $\longrightarrow$ such motive,' and this motive was absent in the case before us: hence, *in the case before us* 'this murder' was absent too. This is better viewed as a case of highly elliptical syllogism than of Immediate Inference.

There is one further precaution to be observed in using the law; a precaution, however, which is probably too simple to require notice except so far as symbols are employed. And perhaps the reader already recognises * that half the mental confusion that exists is really due to the use of symbols,—whether such symbols are imposed upon us by the real need for abbreviation (as *e.g.* in the case of general names), or by what may appear to be the wanton pedantry of logicians. It is easy enough, for instance, to see that the proposition 'Every man is an animal' does not imply that every animal is a man, though possibly some people might be less clear about it if A and B were substituted for Man and Animal. *Latet dolus in generalibus.* But here the source of confusion to which I wish to draw attention is that due to the *time*-element in indications. Where propositions of co-existence are in question, no difficulty can possibly arise, but in the case of succession it may be worth while to notice that where S indicates (or fails to indicate) *future* $\mathfrak{S}$, non-$\mathfrak{S}$ indicates (or fails to indicate) *past* non-$\mathfrak{S}$, and where S indicates (or fails to indicate) *past* $\mathfrak{S}$, non-$\mathfrak{S}$ indicates (or fails to indicate) *future* non-$\mathfrak{S}$. The examples, given above, of the connexion between labour and success, or between typhoid fever and the drainage,† were chosen with the view of showing this necessity. Practically, where actual examples are employed the danger is not likely to arise; but in the absence of an

* With Mr. Keynes, *Mind*, No. xv. p. 366.

† See note on p. 89: examples (4) and (5).

express caution there might perhaps be a tendency to suppose that 'S $\longrightarrow$ future $\mathfrak{S}$' is equivalent to 'non-$\mathfrak{S}$ $\longrightarrow$ *future* non-S,' with which indication (as would be seen at once when translated into full language) it has really nothing to do.

Less important does it seem to mention that mere puns form no exception to the law. No reader, I hope, will be puzzled by the fact, for example, that while the presence of courage clearly indicates 'presence of mind,' it by no means follows that 'absence of mind' indicates anything approaching to cowardice. Logic presents admirable opportunities for those who find amusement in punning,—a fact largely recognised some two thousand years ago. But at present we are not concerned with any difficulties due to merely verbal quibbles.

There remains little more to be said here about the subject-matter of Proof, except to admit as unmistakably as possible that the view of propositions here taken, and the classification here made, is far simpler than would be required for almost any purpose other than ours. For Psychology certainly, and also for the doctrine of Inference in general (as contrasted with reflective Inference, or Proof) very much more would be needed. But in Proof we start always with some *completed* Judgment, some Judgment developed so far as to be expressed, reflected upon, and its validity called in question: hence the growth or formation of the Judgment from its earliest traceable stages is of no direct concern to us. Many of the varieties of grammatical structure correspond roughly

to shades of meaning which vary both in definiteness and strength of assertion, and in richness of implication. These are in themselves of high importance: but before the interest in these arises we need to keep perfectly clear the first broad distinction between proven and not-proven. For such a purpose the plan which commends itself alike to common sense and to Logic, is that of treating the proposition as something put before us in an already formed condition; put forward, that is, as conveying intelligible meaning and deserving intelligent belief. By considering it a pretender to these qualities, and then proceeding to inquire how far it actually falls short of attaining them, we best arrive at some notion of its real position on the long scale between worth and worthlessness. It is on this account that we choose, as being of directest interest, the task of considering in detail the series of possible objections that can be brought against any thesis set up as worthy of belief.

CHAPTER V.

THE PROCESS OF PROOF, IN GENERAL.

I. The Relation between Thesis and Reason.

What is the relation between a thesis, as such, and any reason given for it? What is really said in saying, 'the proposition T* is true, because the proposition R* is true'? This question lies at the root of the doctrine of logical sequence.

To prove an assertion, it was said in Chap. I., is to establish it in full view of hostile criticism: the function of the advocate being to find and bring forward reasons for belief or disbelief, and the function of the judge being to weigh the evidence brought forward, balancing the arguments for and against. Our concern, it has been also explained, is entirely with the latter of these functions, and accordingly we may dispense with all consideration of the *finding* of the arguments.

But suppose an argument already found and produced—suppose, that is, not only a thesis brought for-

* For convenience, T and R will, throughout, be occasionally used for 'Thesis' and 'Reason' respectively.

ward, but also a reason or reasons in support of it;* by what means are we to judge of the binding force of such argument, how test the validity of the reasons given, or the strength of the evidence adduced? The answer to so large a question cannot be given briefly and directly, except in words too general to render real assistance in the special cases. But it may be worth while first to take the broad and distant view. Clearly the most preliminary requisite is that no mistake should be possible as to the full relation between Reason and Thesis, as proposition guaranteeing and proposition guaranteed.

We elected also (p. 73) to neglect the distinction between categorical and hypothetical propositions, as standing outside our interest; and to treat all propositions, whatever their grammatical form, as alike in stating a relation between two terms. But in order to do this it was necessary to explain that the terms of a proposition, so understood, are sometimes themselves propositions,—as in the familiar case of the ordinary hypothetical. Now every argument may be viewed as a proposition of this character, with subordinate propositions as its terms. Every argument states that the truth of R *indicates* the truth of T. Every argument, that is (to apply the law of counter-indication), whatever else it says, makes an assertion expressible in the formula:—

$$R \rightarrow T, \text{ and}$$
$$\text{non-}T \rightarrow \text{non-}R:$$

* Reasons *for* any thesis are, of course, reasons *against* the opposite one; and the expression may therefore be safely generalised as in the text.

which is the symbolic expression for

"Grant R, and T follows, and
Deny T and the denial of R follows."

Or, since in every argument the truth of the Reason is asserted to guarantee that of the Thesis, every argument also asserts that unless the Thesis were true, the Reason would be false.

But this is not all that an argument, as such, asserts. There is another element in every case of attempted proof;* namely, the assertion of the *material truth of the Reason*. Without this, the relation asserted would of course fail in relevance to the matter in hand. Unless the reason brought forward for believing a thesis be itself asserted to be true in fact, the argument as a whole would clearly be devoid of all meaning. It is no argument to say that if some false or doubtful proposition were true, the thesis would be true: to support (*e.g.*) the thesis "England is on the verge of ruin" by declaring "I *could* appeal to statistics if only they were different," or even by means of the reason "Because *possibly* statistics would show."† In other words, failure in material truth

* Cf. Mr. H. MacColl. *Mind*, xvii. 55. "The statement '*a*, therefore *b*' is stronger than the conditional statement '*a* implies *b*,' and implies the latter. The former asserts that *b* is true *because a* is true: the latter asserts that *b* is true *provided a* be true."

† The mere mention of so trivial a fact as this second element in the full meaning of an argument, seems to need some apology; and the present is a good opportunity for remarking that wherever self-evident truths are enunciated in discussing the underlying principles of Logic, the purpose is by no means to convey new information, but rather to go through the duty—irksome alike to reader and writer—of formally

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of the Reason is one danger which every argument must avoid; the sole other danger being that of failure in the *formal adequacy* of such Reason,—*i.e.* the material untruth of the asserted relation between R and T. Any argument, in short, is liable to frustration in two ways:—

(1.) If R be in fact untrue:
(as, perhaps, where England's impending bankruptcy is appealed to in proof of the disastrous effects of Free Trade.)

(2.) If R can be true while T is false:
(as where the Sun's movement round the earth was the Thesis, and the facts of 'rising' and 'setting' were the Reason given.)

As to the first of these two possible attacks on Proof, it is clear that when once the question is raised whether R be true or not, R becomes itself a new Thesis, and must either be accepted without further inquiry or submit in turn to have its own grounds produced for examination; the same difficulty recurring until a basis of accepted truth is reached. It is therefore sufficient for Logic, as such, to carry the analysis of the methods of Proof up to the point where the formal adequacy of the reason given is secured, thus guarding against the second of the two attacks: for the first of them leads to a mere repetition of these methods, only on new subject-matter. Can then

registering such facts, merely to prevent possible misunderstandings, and for convenience in afterwards referring to them.

the highly generalised statement, given above, of the nature and needs of formal adequacy be translated into a shape somewhat more convenient for application to actual arguments? This question will need a rather circuitous answer.

II. CONSISTENCY.

Probably there is no meaning more universally associated with the epithet 'logical' than that of *pushing to the extreme*. That is to say, a man is popularly said to be logical (whether as a term of admiration or of the reverse) in proportion as he shows a tendency to push accepted principles to their legitimate outcome. The logical person is, as a rule, uneasy under any system which, while refusing expressly to modify inconsistent principles, tosses them together and takes the mean result. In his simplicity he supposes that whatever is asserted as true must be intended as strictly true,—true even in its extreme case: a principle false in a single instance becomes to him fallible altogether. Hence he is apt to lack that quality which may be flatteringly called the delicate tact and skill required for handling political or ethical fictions with advantage, or for utilising to the full certain ancient structures thickly coated over with anomaly. The English Constitution, English Law, the English Church, present to such a person continual difficulties. He demands a clear understanding or no pretence of it, codification or else anarchy, absolute submission to authority or else absolute freedom from it. In this sense

it is that the French are called in every newspaper a logical nation, while the English (with the exception perhaps of a portion of the reforming party) have in many quarters quite an opposite reputation.

But this is not all. Besides reading the remoter consequences of principles which are ready-made, the logical person is apt to generalise principles, on his own account, out of isolated facts. Besides being *tenax propositi*, he is eager for justice to be dealt. Not content with demanding that an actually asserted principle (a 'universal' or 'abstract' assertion) shall be true in its extreme cases, he is inevitably inclined to take even purely concrete or individual assertions as covertly asserting a principle,—any disclaimers on the part of the assertor notwithstanding. Thus, if the 'logical' Legislator finds some individual, or some class, in possession of a certain right or subject to a certain duty, he is always under strong inclination to extend such right or duty to analogous cases: if householders and lodgers in a borough have a vote, he is apt to view them as members of a wider class including (at least) householders and lodgers elsewhere: he resists a Permissive Bill on the ground that it is 'illogical' to allow the sale of liquor in one district while prohibiting it in another,—if alchohol is pernicious at all, he argues, it is pernicious everywhere; or if the ratepayers are to have *this* prohibitory power they must 'logically' be allowed the like power in other cases, until there might be nothing left of individual liberty. So again, he considers it indefensible to protect

one branch of industry without protecting all. In a word, behind apparently simple individual facts, he has a keen eye for possible principles involved.

In appealing in this way to what is after all only a loose and popular meaning of the word, I must not be understood as laying more stress on such meaning than it deserves. Popular usage is often, of course, as misleading as etymology, when the purpose is to find the most accurate sense of a term at the present day. But as already explained, such purpose lies altogether outside our interests, our only desire at present being to gather in from any source available the broadest preliminary notions. And while the loosest custom is ever the most widely spread, the widest custom has the best chance of indicating, however vaguely, the more permanent foundations of meaning.

The two correlative 'logical' tendencies just noticed have, it is true, only a remote and indirect connexion with the needs of formal adequacy; but their recognition may serve very well to bring us a stage nearer to the actual point. If to be logical is, mainly, to be *consistent*, perhaps a glimpse at the nature of consistency will afford a closer view of the point in question.

The Maxims* of Consistency (also often called the "Laws of Thought") are commonly given as three in number,—The Laws of (1) Identity,—A is A; (2) Contradiction,—A is not not-A; and (3) Excluded Middle, —A is either B or not-B. Whenever we use a name, we

* Bain: *Logic*, i. Introd. sect. 22.

use by implication the whole meaning belonging to that name, both (1) positively, and (2) negatively: and (3) every 'thing' either deserves any suggested name or does not. By the first Law, for example, 'a man's a man,' whatever else he may also be. And by the second, we must take care that our defining-line is clearly drawn. What is outside A must not be confused with that which is within the range of its meaning. A name may be *qualified*, i.e. may have other (compatible) meanings added to it, as when we speak of 'a strong man, armed;' but incompatible meanings cannot * be joined to it without reducing its employment to absurdity by taking away the meaning already given; so long as two contradictory meanings are supposed to remain in force, each neutralises the other, leaving the total name a blank. A straight line which is also, in the same plane, a curved line, is no line imaginable by us at all.

Trivial though these two † Laws may appear when viewed either as Postulates of Language or as statements of psychological fact, yet as practical maxims for ensuring the consistent use of names they are evaded or violated by everybody every day; and though it may well be held that absolute obedience to them is, in the present state of language at least, practically impossible, it cannot be denied that as ideals they have a certain use. At

* Except as hereafter explained, see p. 139.

† The third law, (excluded middle), deducible from the other two, first comes into importance when we deal with the subject of misinterpretation. For the present it may be left aside.

present, however, our sole purpose is to connect them with the needs of formal adequacy in general.

We seem to have made perhaps rather an abrupt leap, from speaking of holding to Principles, and of rationalising our isolated beliefs by bringing them under Principles, to the question of abiding by the postulated meaning of names. But there is no great leap after all. A general name may be viewed either as something to be *applied* (and thus, in effect, a Principle) or as something to be *defined* (and thus to be brought under a wider Generality).* The use of a general name is twofold always,—to be given to a 'thing,' and to signify certain supposed facts about that thing. Names, in fact, so far as used at all, can only be used as terms in a proposition, whether as S or $\breve{S}$: every general name is applicable to something nameable, and signifies some other nameable thing or things. 'Man' *denotes* (as Mill phrased it) the individual men, and *connotes* the attributes essential to the class. Accordingly the process of attempting to abide by the meaning of our names is, at bottom, identical with that of attempting to abide by our assertions: and in speaking of one we speak of the other.

Every name, then, that has a meaning, by virtue of that meaning refers the object named to its place in a system of wider and narrower classes: to state the full meaning of any name † (or as it is technically called, to

* If N stand for 'general name,' then we may symbolise the use of names as $S \rightarrow N \rightarrow \breve{S}$.

† Otherwise than by merely giving a synonymous term.

define the corresponding *notion*), in every case without exception consists in mentioning some wider class (*genus*) of which the things designated form a part, and also mentioning the marks (*difference*) by which the part in question may be distinguished from the whole remainder of the wider class. Thus 'city' might be defined as 'a large town (*genus*) possessing a cathedral' (*difference*). And if, accepting this definition, we make the assertion 'Manchester is a city,' we state really *two* things about Manchester,—(1) that it is a large town, and (2) that it possesses a cathedral.

Either of these two elements of the meaning of every significant (*i.e.* 'general') name,—the *generic* or the *differential* element—may from various causes become obscured or sink out of sight. One set of minds find a standing difficulty in seeing the wood for the trees, another set habitually fail to see the trees for the wood: the former, fixing their attention mainly on the points of difference, forget the common link that binds the members of a class together; while the latter stop at the broad resemblance, disdaining, or dreading, or simply not perceiving, the obscurer differences of detail. The term 'city' of course, being quoted here specially on account of its simplicity of meaning, does not well exemplify either difficulty: but the majority of general names do exemplify it, more or less. A negro, for instance, is 'man,' with a difference, and perhaps the disputed question whether he is a 'man and a brother' will supply an example of what is here meant—some people, through

seeing clearly that he is not a 'brother,' being inclined to treat him as hardly human; while others, through the obvious fact of his humanity, have perhaps rather overlooked his differential qualities. It is not always, then, so simple a matter as it might seem at first, to take care that A means really A, and not at all not-A; and what is worse, owing to the unavoidable faults of language it is only possible within somewhat narrow limits to "call things by the same names as other people." But here it is sufficient to notice in the first place that it is the Law of Identity which (viewed as a practical maxim) bids us recognise the generic element in the meaning of a name, while the Law of Contradiction draws our attention to the differential line.

Names, then, are employed in Proof as tickets, or marks, or signs. Every general name is a significant label, intended to make a two-sided assertion about the thing that bears it. And consistency demands that whenever we apply a name we shall be prepared to face all consequences and abide by the full meaning of such name: to fail in doing so, is to be inconsistent, and thereby to destroy the value of our own assertion.

This demand, it will be seen at once, corresponds to the first of the two logical tendencies noted above, namely the holding to our Principles. A Principle, in the sense there used, is nothing more than a universal or abstract assertion: To bring any case under a law or principle is precisely the same operation as to bring any S within the range of a name: the purpose in both cases being to

make use of generalised knowledge already supposed to be true. On the other hand the second logical tendency —extension to analogous cases—is a much more complicated affair, being partly mere deductive * consistency and partly a process far more difficult to guard from error. The main feature in the second case is in fact not merely the application of abstract assertions, but also their *formation*,—a process which has often to be carried on with dangerous speed and without the aid of fully outspoken statement. Here too, however, exactly the same two fundamental dangers are present,—namely on the one hand that of overlooking points of difference (between the cases supposed to be analogous) and thus generalising too widely; on the other hand that of neglecting points of resemblance, and thereby not extending the principle far enough. In both kinds of Consistency (accepting for the moment the popular name) all turns upon our accurate appreciation of the points of difference and resemblance: but in Deductive Consistency we are concerned with the differences and resemblances generalised and acknowledged already in the names employed, while in Analogical Consistency the point of primary importance is the nature of the things them-

* As this is the first occasion where the name 'deductive' has to be here employed, it may be well to explain, for those to whom the term is unfamiliar, that deduction, whether used in Inference or in Proof, is always the process of *interpreting* a law in its details, or applying it to the particular cases which it is intended to cover. This may be easily remembered by viewing the process (Deduction) as a *downward* one,—law being 'higher' than fact.

selves, and the extent and kind of difference and resemblance really existing between them.

III. FORMAL ADEQUACY IN GENERAL.

By failure in formal adequacy of the Reason, is meant, it was said, every case where R can be true while T is false. It now becomes important to look more closely at the nature of R in general, inquiring what (if anything) is universally characteristic of such assertions as are capable of supporting a Thesis.

Since by R we mean only the reason actually given or expressed, it must be admitted that there is no universal property of R, as such, except those already mentioned,—namely such as are involved in the mere relation between any Reason and any Thesis. But if instead of the 'Reason' given' merely, we speak of the whole 'rationalisation' of the Thesis,—the reason, if any, implied, as well as the reason expressed—the case becomes very different. For two elements, express or implied, are required for all rationalisation: (1) a Principle or abstract indication (an assertion that a certain sign is trustworthy); (2) an Application of such Principle, or an assertion that the sign is present in the case or cases contemplated by the T: in other words, all rationalisation may be represented syllogistically.

Proof is thus, in an important sense, the counterpart of *Explanation*. The two go hand in hand, and each is only possible in presence of the other. Just as explan-

ation always demands a reference to some wider Generality than that which is to be explained, so Proof always demands a reference to some wider Generality than that which is to be proved. To explain, and to prove, consist essentially in this.* Both are forms of 'rationalisation.' It must not indeed be supposed that such 'wider generality' is always in the first place *formulated*, even in thought,—much less in language. The kind of evidence called circumstantial, for instance, and still more the argument from analogy (or 'parallel cases') are by nature averse from any such restrictive procedure, preferring rather to keep their principles as dim and intangible as possible. But none the less is some principle, however limited (so only that it be wider than the thesis itself), *required* before any test can be applied; and the main business of Logic, as a practical science, is to force, in every case, such principle into explicitness, in order to see whether or no it and its application can bear the daylight, or stand the strain of stubborn fact. An argument, like a chain, must of course be tested by its weakest part: and while either the principle or its application, or both, may be unwarranted by fact, it is the principle itself which presents at least the largest target for attack, and which is therefore oftenest the centre of logical interest. Behind every reasoned belief there is at least one abstract proposition more or less

* We have seen above (p. 108), how in the case of explaining the meaning of a name, the process (Definition) always refers the thing named to some higher *genus*.

vaguely implied: and the most potent engine of disproof, —and through disproof, of proof,—is the process that brings to light these underlying abstract propositions, in order that their validity may be called in question. The rationalisation of knowledge is its reference to principles sufficiently secure from criticism; and it is the Syllogism which helps us to force these principles into explicitness in any given case, and so enables us to inquire into the foundation on which the thesis rests.

In all complete rationalisation of a thesis, then, there is always, implicitly at least, one indication used as an indication, and therefore abstract. This we shall call the Law or Principle. And there is also, implicitly at least, a claim that the case or cases spoken of in the thesis come under such law. Whether this (the 'minor premiss') be itself an abstract or a concrete proposition, it is equally called the Application. The doctrine of the Syllogism, whatever other value it may possess, is mainly useful, as regards the rationalisation of a thesis, for drawing attention to any links that may be missing from the chain of complete demonstration. The present is not however the best opportunity for discussing the details of this operation. In this first general view of Proof, it is sufficient to register the assertion (afterwards more fully justified; see pp. 212, 300) that Syllogism, so far as the said purpose is concerned, is perfectly general in its operation,—applies to all Proof whatever, and is not, as the beginner is apt to think it, an engine to be used in 'Deductive Inference' merely.

As regards Proof, then, the uses of the Syllogism are chiefly two :—

(1) When a person has already admitted the truth of a principle and its application, to bind him down to every particle of assertion thereby made. In this use (as we shall see later) it is an *argumentum ad hominem.*

(2) When any thesis, with its reason, is put forward, to enable us to supply whatever is wanting to complete the Demonstration. We thus apply our knowledge of the syllogistic needs, either in order to determine the general law under which the special case in question is supposed by the assertor to come, and from which the thesis is supposed to derive its cogency,—and this with the intention of inquiring into the *truth* of such underlying assumptions: or else (where no principle has yet been formulated) in order to force the assertor to see what must still be done in order to stop all gaps in conclusive reasoning. The mode of these operations will be more fully developed in the sequel.

PART II.

THE POSSIBILITIES OF ERROR.

SECTION I.—BEFORE PROOF.

CHAPTER I.

INTRODUCTORY.

HAVING thus sketched in outline the main facts regarding Assertion and Proof which are of preliminary importance, we are now at liberty to begin to trace the actual bearing of these on the detection of Fallacy, by examining in detail the openings at which error may creep in.

When an assertion is first enunciated, the Possibility of Error is at its maximum, and we have now to exhibit the process by which, step by step, this possibility may be reduced. We are only concerned, of course, with its reduction to the lowest minimum attainable, not at all with the question how nearly the goal may absolutely be reached. There will be no harm therefore in conceding that after Logic has done its utmost, human fallibility remains: only let us protest against the view that since the moon is out of reach there is no sense in trying to cultivate the earth.

It must be remembered further, that since the

detection, rather than the total avoidance, of Fallacy is the chief object of our present inquiry, this method of diminishing the chances of error is only intended to be used for making sure that such and such a fallacy is absent. By trying which of the series of possible attacks a given assertion or argument can fairly meet, we at the same time discover its point of weakness. If it should pass our whole examination, we discover, not that it is absolutely free from all possibility of error, but merely that such possibility must be of the more remote kind which for practical purposes we are accustomed to accept and disregard.

In the Introduction, the possible objections to any assertion were broadly divided under three heads:—

(1) The objection to its *reality* as an assertion, its capacity for Proof or Disproof; an objection which seeks to condemn the Thesis as such, and without even inquiring what its grounds may be, as containing a mere empty shell of assertion, without a meaning:

(2) The objection that the Thesis is a *mere* assertion; standing entirely alone and without even attempted support; or in other words that nothing has been done to remove the burden of proof: and

(3) That though 'real' reasons are brought forward in support of a 'real' assertion, such reasons are insufficient; which objection is commonly condensed into the two words, *Non Sequitur*.

The plan here followed then will be to take each of these objections in turn, to discuss them by the help of

examples, and also to connect them with the broad principles of Logic. And first in order comes the charge of Unreality.

In a former chapter* unreal propositions were divided under three heads:—

(1) Tautologous, or 'essential,' or 'identical' propositions, or 'Platitudes': (J † already enunciated in the meaning of S).

(2) Self-contradictory, or suicidal, propositions: (J already contradicted by the meaning of S).

(3) The case where any term used in a proposition is, from any cause, devoid of meaning.

In each case, then, it is clear that the meaning of the terms employed is the important matter, and that it is only so far as such meaning is wanting in clearness of conception that this particular fallacy can occur. Definition of the terms is accordingly the direction in which to look both for means of detecting the fallacy and for safeguards against the first of the main objections.

* See pp. 43–48. † Symbol first employed on p. 51.

CHAPTER II.

THE KINDS OF UNREAL ASSERTION.

I. TAUTOLOGY, OR PLATITUDE.

TAKING in order the three heads—Tautology, Self-contradiction, and Meaningless Term,—it may be of service, first of all briefly to enlarge the explanation above given of their nature,—their causes, varieties and results.

First, then, as regards Tautology. Its causes and results are essentially the same as those of the Fallacy known as *Petitio Principii*, or begging the question. The assertion itself revolves smoothly in a circle, just as, in the latter case, that more complex kind of assertion known as an 'argument' may be seen to do.* We render the assertion unassailable, by simply postulating *ab initio* (in the definition of its terms) that it shall not be assailed. Psychologically, indeed, it may be true that in most cases of apparent tautology pure and simple, there is really a fluctuation between two assertions (closely similar, perhaps, in form),—one real but highly insecure, and the other verbal and thereby safe against all attack on the

* Cf. *infra*, p. 193 *ff.*

score of truth; and that we use the former when no one is looking, the latter only when awkward doubts arise. Such, perhaps, would be a fair explanation of what George Eliot calls "those undeniable general propositions which are usually intended to convey a particular meaning very far from undeniable,"—examples of which are often given in her dialogues, as "He said it did as much harm as good, to give a too familiar aspect to religious teaching;" or "The coachman, if he had been asked, would have said, though he might have to fall down dead the next minute, that property didn't always get into the right hands;" or "There's no knowing what may happen before Lady Day." But such cases do not, I think, account for the whole employment of these empty forms: and where the assertion is *purely* devoid of all forward movement, our acceptance of it as bearing a meaning seems to be due to essentially the same slackness of mental tone that enables us to draw satisfaction out of circular proof. Strictly speaking, the shifty assertions above noticed belong rather to *Ignoratio Elenchi*,—a subject to be discussed later: the fallacy being in such cases perhaps, not really that of accepting as capable of test or verification a proposition which contains no real subject-matter for Proof, but rather that of asserting one proposition, and believing, or trying to establish, another. The chief motive for Tautology proper seems to be the desire to say *something* (or to accept any 'explanation' rather than none) on a subject of which our knowledge is not deep or exact. Such

desire is often coupled with a dim feeling that caution in expressing ourselves is necessary: as in a passage which may be quoted from a certain Tourist's Guide—"The expense of travelling on the continent depends more or less on the habits and means of the traveller, and his mode of journeying; and likewise on the rate of charges made in the various countries." So much as this might have been known without the help of any assertion at all, and the belief that it really tells us anything is obviously an illusion.

It must further be noticed that there are occasions when a sentence which as it stands may seem to be the purest tautology, possesses a real value in spite of having, on its own account simply, no capacity for Proof. With these we have already made acquaintance, namely in the statement of Postulates, whether such Postulates are general or special,—'Laws of Thought,' or definitions of given names. When we state the proposition 'A is A,' or when we say "A city is a large town possessing a cathedral," it is certainly true that in both cases the J is already contained, to say the least of it, in the meaning of the S. But these assertions, when so interpreted, are not theses set up for Proof at all. They are merely our means of registering fundamental *assumptions*, whether general or special; and they pretend to be no more than this. Or rather, if in any case they do pretend to capacity for Proof, then their real S or J becomes a very different one from that which appears on the surface. It is conceivable, for instance, that the expres-

sion 'A is A' might be used to convey some such meaning as "One fundamental postulate of thought is that the meaning of a term is capable of fixation,"—a proposition certainly not merely verbal: or again "A city is, etc." might be used to mean "the ordinary (or the best) meaning of 'city' is, etc."—a proposition whose proof or disproof might indeed be difficult but is by no means necessarily out of question. These cases, therefore, do not affect the rule in any way, and are only worth mention in order to bring into greater prominence the difference between asserting anything as *worthy of credence*, and merely registering a Postulate in order to let the full extent of our *assumption* be openly known.

As to the forms in which Tautology occurs, it follows from this interpretation of its nature that it is chiefly to be found in propositions that profess to be in some way *explanatory*, whether explanatory of names or of facts. Thus, a definition may be circular, as where each of two contradictories (as 'luxuries' and 'necessaries') is defined solely by the other, without reference to something known independently of both. Or again, we may pretend to explain the effect of opium by saying that it has a 'soporific virtue.' Or again, we may bravely put forward an abstract proposition (a 'law' or 'principle') which on inquiry turns out to need no bravery at all: as, for example, when we lay down the law that "we ought not to do evil that good may come"—if, as is usual, 'evil' be defined as equivalent to 'that which we ought not to do.' A proposition of this kind is, no doubt,

secure against disproof, but only in the same way as a dumb man may be called secure against speaking falsely, or as a suicide may be called secure against the less voluntary kinds of death.

Passing by the grosser cases of Tautology, however, which have been sufficiently illustrated in the earlier chapter,* the chief problem for practical interest, in this danger as in all, is as to the borderland between what is fallacious and what is valid: the drawing of the line that separates tautology from real assertion. The great difficulty in deciding in practice whether a given assertion is tautologous or not, flows of course from the fact that,—outside names with a purely technical or artificial meaning, as 'triangle,' or 'city,' or 'fee simple,'—the meaning of a word is never completely fixed, but is subject to fluctuations, slow or rapid, gradual or irregular. If there were some competent authority to which appeal could be made in all cases, the fallacy of taking mere platitude for real assertion could no doubt be pointed out in any case with ease: we should simply turn to our dictionary and compare the meanings there given of the words employed. But as yet, unfortunately, no such universal authority exists.

In the first place, when we speak at all of 'the' meaning it becomes important to decide *which* meaning is the object of our inquiry. For the same word may at the same time possess several different *kinds* of meaning, to say nothing of the different *shades* (or amount) of

* Part I. Chap. II.

meaning which it may bear to each individual who employs it. We may distinguish, for instance, as possible objects of inquiry :—

I. The meaning that the word *does* bear,
  (α) to 'most people'—vaguely estimated:
  (β) to some particular person or class of persons,
    (1) under the impression that it is the 'correct,' or the only, meaning:
    (2) As a postulate; *i.e.* as a special meaning consciously put upon it as such by the speaker:

II. The meaning that the word *ought to bear*,
  (α) for convenience in classification, etc.
  (β) on historical, etymological, or other grounds.

It seems, therefore, not quite satisfactory to say with Professor Bain * that "all newly discovered properties are real predications on their first announcement, although immediately on being communicated they become verbal." In one sense, no doubt, this is perfectly true; but the expression quoted needs to be interpreted with care. If, *e.g.* a chemist were to announce that some hitherto supposed element is really decomposable, we can hardly suppose that by the fact of such mere announcement all the rest of the world is at once prevented from investigating the matter: that the assertion has become a mere truism, that to doubt it is henceforth impossible and to test its material truth absurd. So much may no doubt be safely said as this,—that our ignorance or forgetfulness

* *Deductive Logic*, p. 70.

of the truth of a proposition, and hence our power of viewing it as questionable, is what makes it real *to us*. But the point of first importance to notice and remember is, that as a rule when using a name we can only have before us quite a small part of its total meaning, and that we do not habitually remember even all we can: we only remember, or only keep prominently in mind, quite a few of the propositions, regarding the S in question, which we 'firmly believe' to be true, and as a rule those last discovered are least regarded as forming part of the *meaning* of the name. Hence we may repeat, and with a real meaning, propositions expressing even facts discovered long ago,—as that the Earth is round, or that sunrise and sunset are due to its revolution. For purposes of Proof the important distinction lies solely between assertions capable of denial with a meaning, and those which to deny would contradict the postulated meaning of the name employed as S.

In our sense, then, the reality or verbality of a proposition is not determined once for all by the fact asserted having been already discovered, or even being already generally known; but varies with the purpose for which such proposition is now in the given case employed: *i.e.* it depends upon the *prominence* of the already-known fact in our minds at the time of using the name or names forming the S of the proposition. So far as the fact, if known, is *remembered*, so far is the proposition verbal, and any attempt to prove it involves of course a circle in our thoughts: so far as the fact is hidden from memory,

so far there is real matter for Proof. If rotundity enters into our notion of the Earth, then it is obviously futile to ask whether the Earth (so understood) is, or is not, round. But that many people find no difficulty in keeping the attribute of rotundity entirely absent from their notion of the Earth, habitually building up that notion piecemeal from remembered landscapes, if it may not be inferred *a priori*, at any rate may be surmised from the existence of the numerous pamphlets—long post-Copernican—catalogued in De Morgan's *Budget of Paradoxes*. And accordingly the assertion of the Earth's rotundity is capable of being 'real.'

How then does Definition help in deciding whether a given proposition is or is not tautologous? If no absolute and fixed meaning ever exists (except in the case of certain technical terms) how can we establish, in other cases, any general test of tautology?

The most we can really do is to bind the assertor down to a special definition of his own; to ask for the *special meaning* which he intends to keep in view. The meaning of a word is much like the "market value" of an article,—a matter to be settled between the parties concerned. We can, it is true, satisfy our sense of justice, or of general responsibility to our neighbour, by accusing him of ignorance of the ordinary meaning (or, if we are very self-confident, of the *best* meaning) of the words he uses: but such an accusation is a totally different one from that with which we are here alone concerned. It affects, no doubt, our opinion of the speaker's general level of

common-sense or of education, but not at all the question whether or no the assertion as made and intended admits of Proof and Disproof. It should be remarked, moreover, that there is often considerable difficulty, even in this way, in obtaining valuable results. People do not as a rule enjoy being cross-examined,—or only in the rare cases where both assertor and questioner are simply anxious to avoid mistakes; where the claim to oracular dignity on the one side, and the spirit of mischief or obstruction on the other, are wholly wanting.

For besides the real danger of platitude, there is an opposite danger to be avoided, namely that of unduly and vexatiously stopping an argument to have the terms explained. Without wishing exactly to defend those who made Socrates drink poison, one still cannot help recognising that there is a limit beyond which the laudable desire for definiteness loses its value and becomes a hindrance and a snare. There is something so fatally easy in the attitude of a sceptic or mere questioner. Any child can keep demanding explanations, any man sufficiently stubborn can delay the most important truth by pretending not to understand its import. An obstructive policy of this kind requires no great intellectual power, and, when adopted solely for obstructive purposes it demands, as much as anything, a rule of urgency. Life is not long enough for exhaustive explanations.

Here at the outset, then, we find two opposite dangers, and no exact rules can be given for avoiding either. The most that practical Logic can do is to set up an ideal of

clearness and precision, and to demand that where we fall short of it we shall show fair cause for doing so,—*e.g.* the need for saving time or for getting work accomplished. The assertion that explanation ought in a given case to be unnecessary can of course be proved like any other.

II. SELF-CONTRADICTION.

Whereas Tautology is chiefly a failing of feeble or timid folk, self-contradiction is a danger to which the rash and immature seem specially liable. As above remarked, it is more often a fault in expression than in thought. Half the Irish 'bulls' (an Irishman once explained to me) are merely expressions that are too epigrammatic for the slow-moving Saxon mind. And of course, where this is the case, such assertions can always be translated into sober English at the cost of a little trouble or prolixity. If at least, in any case, they cannot be so translated, we have obviously no other means of getting their meaning clear in order to bring them to the test. It is often as painful to translate an epigram as to explain a joke, and a good example of such translation would be rather hard to find. May we say that when an orator once declared that his party had "a majority in everything except numbers," he himself was fully aware of the verbal contradiction, and only intended smartly to rap the knuckles of the god Majority? The answer would depend upon our knowledge of the speaker's mental habits, rather than on any analysis of the words alone.

But paradoxers (as De Morgan called them), though sharing with some great discoverers the honour of being despised at first by Common Sense, do not always resemble pioneers in other and more essential points. There can be no doubt that a good deal of self-contradiction is in fact rather due to hastiness or crudity of thought than to any nobler origin. As Mr. Herbert Spencer notices, "the ability of men to compromise between conflicting beliefs is very remarkable—remarkable, at least, if we suppose them to put their conflicting beliefs side by side; not so remarkable if we recognise the fact that they do not put them side by side." Mere forgetfulness of our definitions may lead us into inconsistency just as well as into repetition: the main difference being that whereas one element among the causes of tautology is often the sense of the need for caution, in self-contradiction this sense seems to be wholly wanting,—often in fact to have its place supplied by a reckless desire for some new thing at any price.

Of contradiction between S and J (as distinguished from contradiction *within* a term,—which comes more properly under our next head) it may be said, first, that its danger depends to a great extent upon dilution. The simpler and shorter the proposition, the less easy is it to find really dangerous examples. "Twice two are five," for instance, runs no risk of being mistakenly accepted for a real assertion; and in treating the subject for our purposes we may in the first place cut off from consideration the cases which are so broad and

evident as to amount to a mere jest. Self-contradictions of this sort are endless, from the heaviest scholastic puzzle to the latest and lightest French or American comic item; and though these may be capable of providing amusement, they are not likely ever to lead to serious error. It follows, however, from our extended view of what constitutes a proposition, that any two (or more) separable assertions, *if intended to be taken together*, may be viewed as one whole proposition; and that therefore we may have a case of unreality even where there is considerable interval between the conflicting assertions. In this way a writer, for example, may contradict himself plentifully in the course of a book, the book as a whole attempting to pass off unreal assertions upon the reader, though the separate items of information may be real enough, and only half of them false. But here again the self-contradiction is comparatively easy to detect. A more difficult and subtle form of the fallacy arises in the case where no assertion is expressly made, but where a question is raised and debated *as if* an alternative answer (yes or no) were possible, when in fact one of these answers would be a tautology and the other consequently a contradiction. As an instance of this may be quoted the question 'Can one individual be at the same time a different individual?'—a case which one would have thought too glaring even for use as an example, if it had not been discussed at some length and with more or less of genuine perplexity in actual writings.

Here, in fact, we begin to get a glimpse of the more serious difficulties in detecting and avoiding this kind of fallacy. Speaking broadly, we have seen that self-contradiction may be due to two, almost opposite, causes, —mere carelessness, on the one hand; and on the other hand all that may be included under the name 'epigram,' a scale that may be made to reach all the way from simple impatient condensation of a sentence, up to the most praiseworthy attempts to rise above the artificial barriers of language. Inconsistencies of this latter kind cannot always be laid to the account of light-brained 'nihilism' of thought, but are rather due to the spirit of deep inquiry, casuistry, or over-carefulness. And the form in which the real danger oftenest appears is, as just said, the raising debate upon unintelligible questions.

We may, then, very briefly dismiss from consideration the simpler kind of self-contradiction, since here there is only one side to be considered. Every one will probably admit that *mere* carelessness, or confusion of mind, is a thing to be on the whole avoided, and only requires to be pointed out; which may as a rule be very easily done. Thus when Bishop Butler, in his 'Analogy,' remarks that where there is the *slightest preponderance* of probability, prudence requires us to act accordingly, and then goes on to say that in questions of great consequence we have to be content with probabilities *even lower* than this; it is not hard to see that the joint assertion is of much the same nature as the saying that "One man is as good as another,—and better." So too when a writer

on Ethics laid down as an inducement to unselfishness the rule that "the less we think about being rewarded, the better *for us*," it was probably a mere want of consistent thought which led him to overlook the fact that he was telling us in the same breath to regard and not to regard consequences to ourselves.* Such slips are however of very frequent occurrence, especially when our case is weak.

But the other source of inconsistent thought constitutes a standing difficulty. Nor does there seem to be any ultimate and quite satisfactory escape from it. It depends upon the real uncertainty of the line between a given term and its contradictory: the old standing difficulty, commonly known by the name *Sorites* (and more anciently called *Soros*),—the difficulty of getting a truly 'scientific frontier' for the names we use. Where there is gradual change from one state to another, or where two opposites, however unchanging, may be viewed as different in kind only through being widely different in degree, how are we to fix the line between A and not-A? Where, for example, is the line between 'nation' and 'tribe,' between 'solid' and 'liquid,' between 'house' and 'cottage?' Or how much money makes a man a 'capitalist'?

The deeper we push inquiry into the exact meaning of any given name, the more certain it becomes that sooner or later we shall find ourselves approaching the main quicksand of language,—the fact that words neces-

* Unless indeed it was merely intended as an *argumentum ad hominem*.

sarily postulate definiteness of outline, while as a fact complete definiteness of outline does not exist in Nature. The line dividing each class from its nearest neighbour is in some cases (*e.g.* between infancy and full age, at law) purely and confessedly a contrivance of our own; in other cases (as between 'good' or 'tall' or 'strong' and their contradictories) purposely left vague because the phenomena either do not admit of, or do not for most purposes require, numerical precision; in other cases (as between kinds, and even varieties, in Nature) is provisionally useful until doubtful instances shall arise. But it is important to remember (1) that in all cases the line is so far an artificial one that it is we who have made and applied the names, and very often mistakenly, for purposes of our own; (2) that in all cases the line professes to be 'length without breadth,' while as a fact there always remains a doubtful margin.* The gap between the opposed classes is infinitely divisible, is subject to constant subdivision as time goes on, and, though it is being gradually narrowed away and its exact position altered by the acquisition of new knowledge, we can never know that the furthest subdivision is reached. A notable example is afforded by the breaking down of ancient barriers that is even now taking place in all departments of Natural History as the development theory becomes more fully understood: one of the best-known problems, for example, that has lately risen into high importance, being—If 'man' has directly descended

* *Cf.* Bain: *Logic*, bk. iv. chap. i. sect. 3.

from 'beast,' at what point in the history of such descent does man, as such, emerge? Various accounts have been given of man's *differentia* from other animals; among the most popularly known of which, perhaps, are that he is rational, has the power of laughing, the use of language, or of tools, or the practice of cooking his food. So far, then, as these points are themselves definite and clearly understood, so far but no further will the employment of any one of them as *differentia* bring clearness into our notion of 'man.' In other words, we may (and, for the purpose of attaining the highest possible degree of accuracy, must) push inquiry into definitions back and back until we reach quite firm and undisputed ground. Thus it may be asked what constitutes rationality? Does a dog reason, however hastily, when having once been scalded he ever afterwards dreads cold water? Is a sense of the ludicrous absolutely wanting in the monkey, and always present in the man? What is language but vocal sounds conveying a meaning, and have not many brutes the use of these? And so on. One definition rests upon another, and inherits the defects as well as the virtues of its ancestry: if the first link in the chain is faulty all the rest must suffer to that extent. Above all, the difficulty shows itself, as just remarked, in that the further back we trace man's history the less we find of all these distinctive qualities—the more imperfect reason, sense of humour, language, tools and cookery: and the inference becomes to many people irresistible, that at a still earlier period these attributes were wholly wanting, or if present

in the germ, at least as uncertainly recognisable as they now are in the case of 'beasts.' At what period, then, precisely, did man first deserve the name? If it be objected that owing to the scantiness of the data, man's remoter history is merely conjecture, we will dispense with this instance altogether, and instead of it take 'man' defined as a 'grown-up child:' at what exact period can the epithet 'grown-up' be applied to him? Most of us have in our own case a lively remembrance of the difficulties in fixing this definition.

It is, however, not our purpose here to attempt to do full justice to the difficulties of language, or to do more than point out vaguely where some of them lie. Words and their meaning are altogether full of unsuspected dangers, but to treat those dangers usefully demands a treatise to itself. When we consider how language has grown, thrown up at first by savage ancestors living from hand to mouth, framed to meet their simple needs and to express the results of their desultory, unassisted observation; altered here and there to compromise with the growing knowledge, but often refusing stolidly to admit past errors, and merely adapting itself by some circuitous fiction to the new-fangled notions (as 'planet' now means no longer a wandering star as viewed from the Earth, but a body moving round a sun—thus including the Earth itself); the ignorance of one age taking root and hampering the efforts of the next to see things more nearly in their true relations; always in fact lagging a little behind discovery, and delaying the birth of the

best ideas that are taking shape; when we consider all this, the wonder is, not that confusion frequently occurs, but that any consistent expression of our thoughts is possible. In fact it is probably not too much to say that we can never be quite secure from all taint of this error. There is consolation, however, in the fact that a good many of our needs too are rough and ready, and that a good deal of what we say is definite enough for the ordinary purposes of life. Where any practical harm can be traced to this difficulty, one business of the logician is certainly to point it out; and to him it may even be to some extent satisfactory to recognise that there is plenty of work to do.

In the case of self-contradiction, as in that of Tautology, much may no doubt be done by inquiring as to the special meaning put upon S *by the speaker*. But the artificial character, and possible unsatisfactory results, of this safeguard rise here into greater prominence, since here attention is attracted rather more directly and openly to the defining line itself; and it must be admitted that, as things are, it is often unfair (or let us say, unpractical and obstructive) to press for exactness of line. There is some value even in vague assertion,—at least where, as often happens, nothing better can be obtained. While allowing that until the contradiction is removed by some means, Proof or Disproof in any strict sense is impossible, it is well at least to recognise that self-contradiction is not necessarily so flat and unprofitable as Tautology. Often, of course, it flows from mere love of paradox, often

also from haste or inattention: but sometimes it will be found that existing language, and not the speaker, is most to blame. And on such occasions the paradox may usually, with sufficient patience, be translated into a real assertion; or else may be accepted easily, and tasted, in an after-dinner frame of mind.

III. MEANINGLESS TERM.

The third class of verbal assertions is far less simple in character than the two just discussed. To treat it fully, in fact, we should have to exhaust the question as to the limits of our power of defining effectively: and this can, of course, not be attempted. There may, however, be some use in showing where that difficulty lies.

But in the first place any term may be meaningless either (1) *simply*,—*i.e.* through want of definition; or (2) by *self-contradiction*,—as where, in a complex term, opposed meanings are verbally combined.

This second case is so closely allied to the kind of verbal assertions discussed in the preceding section, that not much remains to be said. The difference in fact is chiefly a grammatical one; instead of saying 'A belongs to the class not-A, with the *differentia* B' (*e.g.* 'man' belongs to the class 'not-man' with the *differentia* 'evolved' or 'Life is a gradual death') we here say 'A which is not-A is B' (*e.g.* 'Unconscious hypocrites are always the worst') or 'B is A which is not-A' (*e.g.* 'A

continent is an island which, through mere difference of degree in size, is not an island;' which assertions might be resolved into double, or joint, propositions, one member of which contradicts the other. But there is some use in treating these self-contradictory terms separately, since the junction of incompatible members into one term has, on occasion, certain excuses which seem to apply more specially to this case than to that of contradiction between S and $\breve{S}$. In the first place, when a term has from any cause lost its original meaning, there is of course no contradiction in combining with it another which contradicts the original meaning but leaves the acquired one free. We may, for example, use the expression 'bad goods,' or again 'dry humour,' with complete reality of meaning: nor, in a sentence such as "They overlooked the *boundless* field that was before them within the legitimate *limits* of the Science," does the solecism invalidate the assertion made. Conversely, too, a legitimate excuse for such propositions may be simply the desire to call attention to the wrong use of a name, as in 'The present Government is no Government at all,' or, 'If your *facts* are *false*, your inference is useless.' And in the second place, though such an expression as a 'round square' would be generally ruled out of court as meaningless, it seems to be quite allowable to speak of an 'irregular square,' or of 'a globe which is not quite globular. In two distinct cases under this head there is a recognised license to combine terms *really* contradictory:—(*a*) where the qualification is only slight, and the ex-

pression is intended to be merely rough and ready,—as in the instances just given; and (*b*) where the intention is to indicate a mean between opposed notions, as in 'Liberal-Conservative' or 'blue-green colour,' or 'dead-alive.'

Considerable caution, therefore, should be exercised before accusing a complex term of being really suicidal: so much must be allowed. But when all possible excuses have been made, there remains a residuum of cases which are purely fallacious, and which are by no means so rare as might be supposed. No doubt it is chiefly through our power of fluctuating unconsciously between two different beliefs that these 'beliefs' justify themselves to the believer: each separately is seen to convey a real meaning, and it seems to be dimly supposed that since each is a positive belief (how many errors that word 'positive' has to answer for!) the total result cannot in the nature of things be a non-entity. Indeed, this defence has been sometimes almost openly put forward. No doubt where the sole object is to find some form of words 'true' which is at the same time admitted to be 'incomprehensible' we have a contradiction already as a starting-point, and it is perhaps only natural that others should be needed to support it: but natural or not, such a process is apt to confuse people's minds as to what is meant by belief at all, and to blunt the edge of their conscience towards themselves. Possibly this is one reason why the habit of delighting in mysteries retains its hold so long.

Turning now to the case where a term lacks meaning for want of being defined, we may distinguish in the first place the two varieties :—(*a*) where the term simply *has not yet* been defined by the speaker; and (*b*) where a definition has been given, indeed, but one which does not really explain.

The remedy in the first of these cases is of course simple enough; in fact, it only needs mention by way of introduction to the second case. It is clear that when we say 'x is good,' or 'every man is x,' there is no subject-matter for proof until the meaning of the x is declared: and that if it can be declared this had better be done as soon as possible.

What then are the limits to our power of giving names a 'meaning'? And how can we avoid false security in the matter?

Since for definition it is necessary to refer to some higher class (*Genus*), it is clear in the first place that the most general notion of all—whatever that may be—cannot in strictness be defined. A *summum genus*, indeed, is usually taken to mean something much less extended than the one highest *genus* of all, namely to mean the highest in any given series,—which series may of course be a quite arbitrary selection of our own. Thus in the series 'Mineral, rock, stratified rock, limestone,' 'mineral' would be the *summum genus*, although a higher class, namely 'material substance,' might easily be added to the series, and beyond that again the class 'nameable thing.' It is therefore incorrect to say that no *summum*

genus is definable,—unless we are speaking only of the one highest of all; or unless we consider the inexplicable nature of this ultimate notion to vitiate all other general names, since all may be traced up to it. In absolute strictness there seems, in fact, to be no escape from this difficulty. It is, no doubt, always theoretically lawful, though not always practically expedient, to push inquiry into the meaning of a name back into Metaphysics,—just as it is possible to demand any other kind of ultimate explanation. Any objection to such inquiry can only rest on the plea of practical needs; and it is not easy to say how far such plea itself will bear stretching,—for who is to decide that our view of practical needs is sufficiently long-sighted?

It certainly seems as if—to quote Prof. Bain *—"the highest universe of all must contain at least two things, mutually explaining," and that our highest definitions must accordingly be merely circular. Short of this ultimate circle, or assumption, however, we can of course take care to avoid all narrower circles in defining.

The only other kind of delusive definition that need be noticed in this connexion is that sometimes called 'defining *ignotum per ignotius*,' as where a writer explains the meaning of 'miracle' to be "an abnormal exercise of constitutional sovereignty on the part of the very divine EGO, in respect of the subsistere of the cosmical selfhood of the metamorphosed NON-EGO." Here we can of course either take the requisite pains to make

* *Deductive Logic*, p. 59.

out the real meaning intended, or we can wait for some more easily intelligible information. But until such additional process has been performed, any proposition containing 'miracle' as S or $\breve{S}$ remains obscure.

As regards the whole question of the need of definition, it should be remarked that the mere fact that the terms have not yet been defined, or have been imperfectly defined, does not of itself necessarily deprive an assertion of all 'real' meaning. If this were so, indeed, the conveying of information would be even a more lengthy and troublesome process than at present. It is only when the need is felt, as such, by the person addressed, that the assertion can fail, in this way, on the ground of unreality: for where the audience put a *wrong* meaning (*i.e.* one not intended by the speaker) on the terms employed, there is misunderstanding, perhaps, and there may be fallacy on one side or the other; but inasmuch as the audience do put some meaning on the assertion, it is real to them.

IV. UNREAL ASSERTION: CONCLUDED.

We have seen, then, that against the fallacy of taking an unreal proposition for a real one, the remedy in all cases is to be found in definition of the terms employed; and that everything depends upon the *special* meaning given to them by the assertor; since any apparent tautology or contradiction may have its fallacious character removed, any unknown meaning may be made

known (within the limits indicated above) by such special explanation. We have seen, too, that Tautology is intimately connected with the fallacy of *Petitio Principii*, or circular proof, while self-contradiction, except when merely used to condense a real proposition, is really a case of inconsistency,—sometimes due to mere carelessness, sometimes to the fact that lines of distinction in nature, on the preservation of which all consistency depends, are artificial contrivances of our own, which do not exactly fit the facts, but can only be roughly justified. And as regards explanation of the meaning of a term, we must admit, I think, that there is a point beyond which any attempted explanation becomes unreal; and, hence, that the distinction between reality of meaning and mere verbality has a value only so long as we keep away from the deepest difficulties.

Before leaving the subject, there are one or two points to be noticed as regards unreal assertion in general rather than any special form of it. First of all it may be well to distinguish clearly between verbal assertion (*i.e.* tautology) and verbal *questions*,—as where a disputed point is said to be "merely a question of names." Whately has expressed as concisely as any one the distinction between verbal and real *questions*,—"If it . . . appear . . . that the opposite sides of a certain question may be held by persons not differing in their opinion of the matter in hand, then that question may be pronounced verbal, as depending on the different senses in which they respectively employ the terms. If,

on the contrary, it appears that they employ the terms in the same sense, but still differ as to the application of one of them to the other, then it may be pronounced that the question is real,—that they differ as to the opinions they hold of the things in question." "If, for instance," he continues, "two persons contend whether Augustus deserved to be called a 'great man,' then if it appeared that the one included under the term 'great' disinterested *patriotism*, and *on that ground* excluded Augustus from the class, as wanting in that quality, and that the other also gave him no credit for that quality, but understood no more by the term 'great' than high intellectual qualities, energy of character, and brilliant actions, it would follow that the parties did not differ in opinion, except as to the use of a term, and that the question was verbal. If, again, it appeared that the one *did* give Augustus credit for such patriotism as the other denied him, both of them including that idea in the term great, then the Question would be Real." In short, there may be a real assertion made about a name just as well as about any other S; and often this is made in so confused a fashion that there is difficulty in seeing what is intended. Of course, where two persons really agree about the actual qualities possessed by Augustus, and one says, 'these qualities, good and bad together, on the whole entitle him to a place in the class of great men,' while the other says 'precisely the same qualities do *not* entitle him to the name,' the former really asserts, while the latter denies, that (in their respective opinion) the

best meaning of 'great' includes that particular mixture of qualities which both allow to belong to Augustus. But the difficulty in the matter usually flows from the fact that neither party to the discussion knows very clearly either what qualities he does actually suppose Augustus to possess, or what qualities he does actually include within his meaning of the name. All that we are concerned to notice, however, is that the confusion—if confusion there be—is not that of mistaking an empty form of words for a real assertion, but of mistaking one real assertion for another. The question whether or no a given definition is a good one may indeed be properly called a 'verbal question,' but it is clearly not a question without meaning or without important consequences. An assertion about the meaning of a name, when understood as such, is not a verbal assertion in the sense of being incapable of Proof.

Another question, of side interest, may be just mentioned for dismissal. Since the reality of an assertion is coincident with its capacity for Proof and Disproof, are we to distinguish degrees of 'reality' according to the completeness and definiteness of the possible test to which different real assertions are liable? It is obvious that assertions vary very much in this respect. Is, for example, the assertion, 'You will find him in the next room,' more *real* (because more capable of being brought to a conclusive test) than an assertion regarding the details of the distribution of ice over Europe during the last Glacial Epoch? Certainly not. As I have intended

to use the term 'real' throughout, there are no degrees in it,—no standing-room between real and unreal. If it be desired to express the distinction just spoken of, there are other words,—such as 'verifiable'—which would answer the purpose better. By 'capacity for Proof and Disproof' was not meant the degree of ease or certainty with which the assertion might be established or overthrown, but the mere fact that there is at least no absolute impossibility, in the assertion itself, that relevant evidence, weak or strong, should ever be produced. The unreality of a proposition is not in any way connected with the mere inaccessibility of Proof and Disproof, but with their total inapplicability. To establish or demolish some 'real' hypotheses may be as difficult as to establish a dynasty, or to remove a mountain; but to support or disprove an unreal proposition is as impossible as to support a dead Pretender, or to remove a hat from a head already bare.

CHAPTER III.

THE BURDEN OF PROOF.

SUPPOSING a Thesis sufficiently free from the taint of unreality, two other main objections or opportunities for attack remain. And the first of these, as already said, is the objection that no proof has been attempted,—that the thesis is a *mere* assertion, standing entirely without support or evidence.

Evidence, it should be at once noticed, is not here used in the more restricted sense that would contrast it (*e.g.*) with 'authority' or with 'hearsay;' but as broadly as possible, so as to include the weakest kinds of evidence as well as the strongest. It is just as truly an argument, for example, however fragile, to claim that a given assertion is true because it occurs in a certain book, or was made by a certain person, as any other 'reason given for belief' would be. The contrast between supported and unsupported assertions does not depend on the strength or weakness of the reasons, but on whether or not reasons of any kind are given. The full question as to the burden of Proof is sufficiently confusing in

itself, without our introducing further entanglements prematurely.

Two cases are to be distinguished:—(1) Where an assertion is put forward simply as 'self-evident,' or free from all need of Proof; and (2) where the assertor supposes (or tries to lead his audience to suppose) that his sole concern as assertor is to frustrate, one by one, attempts at Disproof made by some one else.

The first case need not detain us long. For while fully admitting that without some 'self-evident' truths, no Proof of any assertion would be possible, it can hardly be denied that what seems self-evident to one person may seem to another to stand much in need of external support. And since the whole meaning of the Need of Proof is need as felt by the audience, and not as the assertor happens to think the audience ought to feel it, they, and not he, must be the arbiters. If the assertion is not to them self-evident, they are under actual disability to believe it until external evidence is produced. I am speaking, of course, of genuine belief, intelligent and rational, and not of mere voluntary acceptance of a formula, as an act of obedience or otherwise. It may, indeed, often happen that the grounds are so numerous, or have been so long forgotten through disuse, that their production would be difficult or impossible. Deep-lying and complicated beliefs, especially when illumined by emotion, or when the more physical element in them is prominent, are very liable to this difficulty,—the beliefs (*e.g.*) on which our likes and dislikes of persons

or of systems, or of courses of action, are founded. But none the less unsatisfactory must such beliefs remain to an audience not already convinced, until the grounds can be openly brought forward and examined: and our concern is, of course, entirely with the point of view from which the assertion is still a *thesis*, and not with that from which it is a firmly established conclusion. Until the grounds can be examined no test is possible: the assertion may or may not be true, for all the audience can say. Against the honest objection, 'This is not self-evident *to me*,' there is clearly no appeal; and no remedy except through the production of real external evidence.

The second case, however, is far more complicated; sufficiently so, in fact, to have notoriously confused the mind of no less a logician than Archbishop Whately. This is another of the numerous cases where statement is easy but application difficult, and where the whole practical value depends on the application. Stated shortly, the fundamental rule is that "He who asserts must prove;" * and so long as an assertion is undisputed, difficulty cannot arise. But the chief source of real perplexity lies in attempting to keep a clear line between denying a thesis, and merely reserving judgment,† or

* Even in Law this maxim seems to be fundamental. *Cf.* Sir Jas. Stephen's *Digest of the Law of Evidence*, 3rd ed. pp. 100 ff. "The burden of proof as to any particular fact lies on that person who wishes the Court to believe in its existence" (art. 96). See also Articles 93 and 95.

† Hence De Morgan and others have preferred to treat displacement of the burden of proof as a case of *Ignoratio Elenchi*. See also the examples at p. 188 of this book.

between disputing an argument and merely asking to have it expanded and made satisfactory. This, at least, is one of the points at which confusion is in the first place most apt to creep in. It is obvious that an unsupported assertion may or may not be true, and it should be carefully noted that the absence of produced evidence,—or even the absence of the possibility of producing evidence,—is a very different thing from Disproof. Where nothing *is* said either for or against a thesis, its truth simply remains an open question; and where nothing *can* be said, the doubt is only more permanent in character, not otherwise more triumphant. The objection, 'This is bare assertion,' does not attack directly the truth of the assertion in question, but attacks the supposition that such truth is as yet established. Hence assertions which are confessedly mere suggestions escape unscathed, since all the harm which the doctrine of the burden of proof can do to them is done already, and willingly, by their assertor himself. It is only where an assertion is definitely made that the grounds of belief can be demanded with any meaning.

The simple statement of the rule, that "he who asserts must prove," needs, however, certain explanations before it can be accepted in its entirety: and the best way to bring these forward seems to be by pushing the simple rule into its extreme cases. In the first place, then, if the burden of proving lies always on him who asserts, it is clear that whoever asserts that a thesis is false must accept a burden too: and also that he who

asserts a reason as sufficient, or claims that it is certainly insufficient, is in exactly the same position. These three cases do not present much difficulty, and will, I think, be readily admitted by all.

Suppose, for example, I assert some article of popular faith,—such as that women ought not to enter the learned professions; my audience may either accept the assertion offhand, or deny it offhand, or be content to ask for reasons. In the first case the burden passes simply unnoticed. In the second case, the audience, as assertors accept a burden of their own. In the third case the burden rests on me, just as it would if I proclaimed the most startling novelty. For the doubt may be suggested that though widely believed, the assertion is possibly without secure foundation. That is to say, two courses are now open to me—unless my audience are unusually feeble disputers—either to take my stand on the bare unsupported assertion, and so leave my questioner certainly unconvinced; or else to attempt to remove the burden by producing the best available reason. If I adopt the latter course, it is clear that any permanent removal of the burden depends on the strength of the evidence brought forward. But the difficulty is, that at every stage of an argument the line between interrogation and flat denial is often hard to preserve, and a sophist, when pushed by awkward questions, will always try to shift the burden upon his questioner. Thus, I may perhaps argue, in favour of women's restrictions, that "one needs to know that a

given innovation is *not* dangerous, before proceeding to say confidently that the time has come when it may be made." Very true, but I am now shifting my own ground, and trying to fasten on my questioner a positive assertion which he has never made. I have quite ignored the third alternative that lies between 'saying confidently that the time has come' and my own equally confident original assertion that such time has *not* yet arrived; namely, the alternative of holding my tongue, or at least of softening assertion into mere suggestion and asking modestly to hear the possible objections. If my opponent understands the doctrine of the burden of proof, he naturally proceeds to point out my mistake. We need not develop this particular argument any further, since enough has been shown to illustrate the point immediately before us. Whatever reasons I may produce, so long as difficulties in seeing their cogency are genuinely felt, it is clearly my concern to remove them if I can.

Secondly, it seems undeniable that even the most cautious sceptic cannot escape a certain responsibility. The burden of proof must rest on him who asserts that an assertion is *doubtful*, just as much as on him who asserts it true or untrue. But two very different meanings may be distinguished, in calling an assertion doubtful,—the one, that I (the objector) feel a doubt; the other, that you (the assertor) *ought* to feel one. If I merely intend the former of these two meanings, my responsibility (which may still be fully admitted) applies not at all to the point at issue, but to a matter of side-

interest,—the question whether I am, or am not, honest in making the demand. It is conceivable that I shall not take any pains at all to avoid the imputation of quibbling. The sceptic may in general be more easily content to leave the other side alone. We are seldom as anxious to prove our ignorance or obtuseness as to prove our knowledge or insight, and hence the sceptic may cheerfully neglect such burden as falls on him. And, in any case, the course he chooses to take in this matter does not affect the point at issue between the parties.

Lastly, it follows that even he who asserts the most widely accepted doctrine cannot escape the 'burden' of supporting it by reasons. The burden of proof rests, for example, on those who maintain the theory of gravitation or of the rotundity of the earth, just as truly as on any one who should set up for his thesis the denial of either: the difference is that in asserting such truths as these the burden is apt to pass unnoticed, from the fact that the evidence is strong enough to shift it easily, while in denying them the burden might really be felt as a serious weight. And this leads us to speak of the chief practical difficulty in the matter,—the point where Practice demands that inquiry shall be stifled.

Whately's doctrine of the burden of proof* was brought forward, as his readers will remember, partly for the purpose of annihilating Infidelity by a short and easy method: but it is none the less worth considering in itself, since the confusion into which he fell is a very

* *Rhetoric:* Part i. chap. iii. § 2.

excusable one, though probably not often effective against the more modern kind of Infidel. "There is a Presumption" he writes "in favour of every *existing* institution" . . . "Christianity *exists;* and those who deny the divine origin attributed to it are bound to show some reason for assigning to it a human origin." Of course, there is "a presumption in favour of any existing institution." Since it already exists, any one wishing to abolish or alter it must, of course, in the first place make an assertion to that effect, and also produce his reasons,—or else nothing will probably be done. But a presumption of this kind is a very different thing from a presumption that *an assertion made by an existing institution is true.* Various forms of Paganism exist; are we therefore to believe without inquiry whatever their followers may choose to assert about them? No doubt this verbal ambiguity was complicated also with another confusion,—that between *denying* and *questioning* the divine origin of the institution: the Archbishop very naturally failed to put himself exactly in the position of a real unbeliever, and was considering only the case of one who should set out to prove *to a believer* that his belief was misplaced. In such a case certainly the burden would in the first place lie on the infidel, as being the person making the assertion. But it is surely not often that infidels are so generous. Or rather, to put it more fairly, they have not the same reason to be anxious to convert believers as the latter have (admittedly) to convert them,—since no infidel pretends to

believe that a Christian will miss incalculable benefits on account of his Christianity. Hence it is the unbelievers who really take the unassertive position, not professing to have any valuable information on the points directly in question, which information they are eager to impress on the other side; but quietly willing to examine (with minds, at least professedly, open and candid) any assertions brought forward and supported. It is the believer whose mind—even on his own showing—is no longer open: he it is who claims to have already weighed all the arguments and arrived at a firm decision; who claims the possession of valuable information which he is burning to impart,—information so valuable that, except on the plea of extreme difficulty in producing unexploded reasons, it seems almost cruelty on his part to be content with bare assertion. Certainly, any one who should set up, to a believer, the thesis 'Christianity is of purely human origin' must bring forward his reasons for that thesis, or else expect the believer to remain unshaken: but on the other hand any one who sets up, to an unbeliever, the thesis 'Christianity is of divine origin' is in exactly the same position. Professed ignorance, however often a mere pretence, and however often (when real) a sign of culpable indifference or of pitiable want of power, is also the natural and normal position of the anxious mind, until anxiety is removed by the production of evidence that at least seems sufficient.

And here it seems in place to notice that the real difficulty as to the burden of proof is somewhat deeper

and more serious than might be supposed either from a bare statement of the fundamental rule, or from a rough description of the cautious attitude in one or two rather artificial controversies. In Logic altogether there is often a danger of treating words as more than counters, and so of giving an air of wordiness and trickery to the results attained; and in all this matter of the burden of proof the danger in question is perhaps especially active. It is not only in disputes and verbal arguments that the correct placing of the burden is important, but wherever we are called upon to judge whether all objections to an assertion have been properly taken into account; as where, for instance, we have to decide between accepted theory and awkward fact. The difficulty at last resolves itself into that of saying what shall constitute 'practically conclusive' prejudice.

How far, for example, are we 'bound to explain away' a so-called fact? If we already have an apparently well-established theory regarding, say, the impossibility of corpses reviving, or of 'spirits' holding communication with the living, or even if our theory goes no further than to deem some given behaviour of mind or matter a physical impossibility, what is the rational attitude towards a claimed miracle, or ghost-story, or mere narration of marvellous fact for which no explanation is offered?

We need not now, of course, hesitate at any purely verbal obstacle. We may say, if we like, that the bare notion of a 'miracle' involves a contradiction

in terms; this merely means that if we were sufficiently wise there would be no room for wonder. But that the blind should receive their sight in an unexpected manner, or that a conjuror's performances should lie beyond our powers of explanation, involves no contradiction or impossibility, except on the assumption that we have already exhausted all there is to learn. When Mr. Venn* says that "few men of any really scientific turn would readily accept a miracle, even if it appeared to happen under their very eyes," what is meant is that, though surprised at first, they would either "soon come to discard it afterwards, or so explain it away (*i.e.* bring it under known laws) as to evacuate it of all that is meant by miraculous."

The rough and ready doctrine may be called that of the existence of 'fair presumptions,' whether left indefinite, as in common parlance,† or—as in law—

* *Logic of Chance*, p. 450.

† And perhaps in Science. Thus Professor Tyndall, in speaking (*Floating Matter of the Air*, p. 305) of the experiments to disprove Spontaneous Generation, claims that whereas life in the sealed test-tube may always be due to errors of manipulation, the absence of life "involves the presumption of correct experiment." The difference between scientific 'presumption' and unscientific is, however, worth noting. By this claim it is not meant that a single failure to find life in certain conditions is sufficient at once to remove all doubt: the patience with which Professor Tyndall's own full investigation was conducted bears witness to the contrary. But it is merely claimed that where the instances for and against are equal in number, the evidence is "not equally balanced," and that "as regards the fruitful flasks [a careful inquirer] would . . . repeat the experiment with redoubled care and scrutiny, and not by one repetition only, but by many, assure himself that he had not fallen into error."

defined to some extent by set rules. It amounts, in brief, to this, that where there exists a 'fair presumption' in favour of a belief, or where a belief is in harmony with prevailing opinion, the assertor is not 'bound' to produce evidence, but that whoever doubts the assertion is bound to show cause why it should *not* be believed. The value of this procedure, as a short cut or as a weapon against mere obstruction, must be apparent at once. A Law Court, for example, one of whose unavoidable limitations seems to be the occasional necessity of sacrificing the individual to the average—*i.e.* of resting content with caring not at all about the *minima* of justice—may derive on the whole great advantage from such special rules, at any rate as regards speed in getting through its work. Thus, a person found in possession of stolen goods soon after the theft, is presumed to be the thief, and has to prove innocence although he is the accused party. If a married woman in this awkward situation proves that she stole the goods in the presence of her husband, but asserts that he compelled her to steal them, she escapes the burden of proving this latter assertion, since the Law considers it self-evident.* And every rule that dictates in general how given facts or admissions shall be construed, is an example of this procedure. Convenient, however, as such a plan may be where there is an authority competent to frame the rules, it is obvious that outside certain artificial institutions, existing for some

* *Cf.* Stephen. *Digest of the Law of Evidence.* Articles 95 and 96. *Cf.* also De Morgan: *Formal Logic*, p. 261.

special purposes, no such authority exists. Argument in general cannot undertake to be bound by what this man or the other, or any body of men, may happen to consider a 'fair presumption.' Logic shrinks into mere cleverness under the bondage of Rules for Debate, and dogma cramps the reasoning powers. If, as Whately claimed, those who put forward assertions in harmony with 'prevailing opinion' were to be altogether exempt from giving a reason for the faith that is in them, or if those who bring forward facts in opposition to prevailing opinion were to be thereby ruled out of court at once, with whom would rest the right of deciding what assertions and facts really come within such privilege? Even an Archbishop, it must be acknowledged, might fail to catch the precise moment when a struggling truth really begins to 'prevail:' and ordinary folk, who only desire to follow the safest leader, have often the greatest possible difficulty in deciding which party shall claim their allegiance and support. At least it might very well happen that any two people should fail to agree as to what *is* the prevailing opinion,—much more, as to what it ought to be. Perhaps then we must rely upon the submissiveness of our audience? Such a view comes near being an 'Idol of the Cave.' Rather, it should perhaps be called an Idol of the Hothouse,—a tender plant, that can never thrive long in the open air.

Common-sense has, of course, a very justifiable liking for short cuts wherever practicable. Rough and ready rules for interpreting facts have a value certainly,

even outside a Court of Justice. But there is all the difference between using these as our servants, and allowing them to become our masters. So long as they are employed confessedly as a mere apparatus for saving time at the cost of some exactness, no harm is done: for where the thesis is more than usually important we can take more than the usual care. But if we suppose that whenever a bold assertor takes refuge behind his two-thirds majority, the spirit of free inquiry ought at once to apologise tamely for having dared to put awkward questions or to bring forward awkward facts, we have only ourselves to blame for the loss we suffer. The assertor who shirks inquiry can always be shown to be shirking, by the simple process of putting the question clearly and letting others see that it remains unanswered.

Both the practice of relying on prevailing opinion then, and also readiness in accepting subversive facts as undeniable, have a double edge, and need a little care in using. If Science lays down a theory, or Guess-work a doctrine, conflicting facts or probing questions may both be awkward. But a question differs, after all, from an asserted 'fact' in one very important particular, —it carries no burden itself. A 'fact' stands in need of evidence, whether or no it conflicts with theory: and clearly, the firmer the theory the greater the caution required in accepting evidence for the conflicting fact. We find, no doubt, very often, that the ease (or difficulty) with which a 'fact' is accepted depends more on prejudice against (or for) a given theory than on the presence

(or absence) of undeniable support for the fact itself: but even where the fact does rest on evidence of its own, we should not forget that in judging that evidence also there is involved a very large amount of rough and ready presumption; that in all observation there is involved a certain amount of inference. To say that the supporter of a theory is in any way 'bound to explain away' a given supposed fact, may be just as high-handed a proceeding as for the theorist to condemn the fact unheard. It must be proved to be a fact before it has any bearing on the theory; otherwise, it is clearly a case of "so much the worse for the facts." There can thus be no law laid down which shall settle all disputed cases *a priori:* we can only come back, after all, to the one fundamental principle that wherever proof is demanded, we must either be prepared with sufficient evidence, or prepared to see the hopeful proselyte unconvinced.

Shortly, we may sum up the worst of the difficulties surrounding the question as to the burden of proof as due partly to the unfortunate ambiguity of the expression itself, and partly to an endless source of trouble,—the practical need of striking some balance between faith and hesitation. The mere ambiguity of the expression may be met by remembering that the 'must' of the rule is only sanctioned by the assertor's eagerness to convince his audience; and that to 'assert' must therefore be defined to exclude that milder type of assertion where we either state an opinion as a fact in our mental history,

or tentatively and with a view to learning what the objections to it really are.

In Logic, then, when we speak of the burden of proof, we are not speaking of some artificial law,—some merely legal, or perhaps Parliamentary rule,—with artificial penalties attached to it. No doubt much that has been written, even in logical works, has been written with some such view. For centuries after Aristotle's time, argument appears to have been regarded as a kind of intellectual game, in which each player might try to obtain what advantage he could, so long only as he obeyed the rules laid down. The microscopic ingenuity with which the Schoolmen carried on the elaboration of these rules was well worthy of a better object. But here, at any rate, we are free from any such limitations. No penalty follows the misplacement of the burden of proof, in the strict sense in which we here use the expression, except the natural consequence that the assertion remains untested, and the audience therefore (if inquiring) unconvinced. To lay the burden on another, therefore, is not to demand Proof at the point of the sword, but rather to request it as a favour. There is no 'obligation' on any one to prove an assertion,—other than any wish he may feel to set an inquiring mind at rest, or to avoid the imputation of empty boasting. It is a natural law alone with which we are here concerned,—the law that an unsupported assertion may, for all that appears, be either true or false. And a corollary is that the more intelligent the audience the less easy will it be to pass

off upon them a bare assertion under the pretence that they are in any way 'bound' to disprove it or explain it away.

And, as regards the practical need of recognising fair presumptions, the best key seems to be to keep quite clear the fine distinction between two really different doctrines; one, the firm foundation of all the cogency that Proof can ever attain, and the other the tottering shelter for boastfulness that fears to be found out. The former may be described as the doctrine that before we can safely *accept* a given theory we are bound to discard all possible rival ones: the latter the doctrine that before we can presume to *decline to accept* a given theory, we are bound to provide an efficient substitute. Nakedly stated like this, perhaps, their difference is easy enough to see, but there are aspects (or uses to which they may be put) under which they become rather more difficult to keep distinct. Thus, for example, a theory occurs to us as satisfactory, and instead of actively trying to find out all that can be said against it, or what rival theories are possible, we entitle it a 'provisional theory,' or a 'working hypothesis,' and then proceed at once to dismiss all doubts from our mind. I am not, of course, saying that this provisional contentment is always to be avoided,—only that there is more of it in circulation than would, perhaps, be the case if our notions of the burden of proof were kept quite clear. The inclination to believe without inquiry has long ago become a confirmed habit of the human race; dating, no doubt, from the times when

sheer necessity—poverty of knowledge—led us to invent our facts: while the use of provisional theories as such, *i.e.* with full recognition of their imperfections, seems to be an art which, with all our good intentions, we are only slowly learning.

Further, since where no Reason is given the Thesis may be either true or false, a second corollary is, as already noted, that the absence of a reason given is no conclusive condemnation of the assertion made. Whether it should even raise a presumption of weakness depends, of course, on circumstances. It would not do so, for example, where the assertor, without any motive for untruth, is merely relating unmistakable facts within his own experience,—as that he came down by the Midland Railway, or that he usually buys his books at a certain shop. As a broad rule, in fact, we might say that the need for proof depends on three classes of circumstances,—the likelihood of mistake, the likelihood of falsification, and the importance of the assertion made. Where all three of these are at a minimum, the need for proof is at a minimum too: where any one of these rises into prominence, the demand for proof begins. Thus the assertions (1) that I saw a ghost, or, (2) that defendant was elsewhere at the time the deed was committed, or, (3) that the earth will be baked to a cinder in 1897, would be generally felt to stand in need of evidence. Closely bound up with the need of Proof is, of course, the presumption of weakness which its continued absence is apt to raise. That is to say, where the need is strong the

call is usually audible; and deafness is known to be often largely voluntary. But so far as appears, no general rule can be framed for judging of the strength of such presumption in a given case. Even distinct unwillingness to produce the grounds of belief is an ambiguous sign,—much more so is the mere absence of evidence, however strong the call for Proof. Unquestioning faith, for example,—the failure to see any necessity for examining the grounds—is often a cause of unsupported assertion. So is the simple desire to avoid trouble. So is distrust of our audience. So again, as already noticed, are the mere number and extent of the reasons, and our fear of failing to do them justice. Insecure faith—the fear of losing the belief if strict inquiry should be made—is only one cause among many: nor, even if it were the sole explanation of such unwillingness, would the sign be beyond dispute. For misplaced timidity in our beliefs is not altogether unknown.

Much the same applies to the case where the assertor does produce evidence, time after time—either old arguments or new ones—and yet every time such evidence is found, by the best tests obtainable, to be insufficient. The practical difficulty is that of saying *where* our rooted distrust shall begin. The failure of argument, however long continued, never indeed amounts to conclusive disproof; since either the real difficulty in producing the sufficient grounds, or the assertor's want of skill, may be to blame. But it can hardly be denied that the presumption does in certain cases become very strong

indeed,—quite sufficiently so for many rough practical purposes. Since, however, there does not yet appear to be any means of generalising the cases satisfactorily, it seems best only to notice this as a standing difficulty in the complete practical theory of Proof, at present beyond the reach of anything more definite than what may be called a kind of logical tact. It is, however, a side issue, and does not affect the 'burden of proof' itself.

It is quite possible, therefore, to be over-pedantic or vexatiously unpractical, in demanding Proof, just as in demanding explanation of the meaning of a term. And in this case as in the former the question whether a given demand is on the whole conducive to the interests of practice may indeed itself be raised and answered, but otherwise lies quite outside the scope of our inquiry. In strictness any assertion may have its grounds called for; and until they are produced and examined, the assertion remains *untested*. Whether practical convenience decides that in certain cases the assertion may safely be left in this state, is another matter. We are only concerned with those assertions which are already erected into theses; *i.e.* which have, in the opinion (mistaken or not) of the audience, sufficient importance and doubtfulness to make proof desirable and demanded.

SECTION II.—NON SEQUITUR.

CHAPTER IV.

INTRODUCTORY.

WHEN a real assertion is made, and reasons of some sort given for believing it, such reasons may perhaps be inadequate as a guarantee. In a former chapter (p. 102) it was noticed that all the dangers in accepting any Reason as evidence for any Thesis, may be reduced to the two main heads, (1) Failure in formal adequacy, and (2) Failure in material truth, of such Reason; and further, that the first of these departments is the only one that needs analysis in Logic. *Non sequitur* is thus co-extensive with failure in the formal adequacy of the Reason.

We here reach what may be considered the central and most important part of the whole subject, and the part which certainly presents by far the greatest difficulties. The chief source from which these difficulties flow is one whose influence is not confined to Logic, but is felt more or less in all departments of knowledge,—the need for compromise between the completest possible

investigation and a sufficient degree of speed in practice. It seems to be inevitable that in *applying* Logic some compromise between these conflicting desiderata should be made: all that can be done is to recognise the compromise as such, keeping a jealous guard against unjustified encroachments, yielding, of course, where it can be seen that the gain is worth the price, but in such cases remembering always that a certain risk is being run.

To speak less generally, the main difficulty against which any methods for the accurate detection of Fallacy have to contend is the convenient practice of employing guesswork. In many cases it is possible to see at a glance, with quite sufficient accuracy, what the *cause* of the fallacy has been; and it is then, perhaps rightly, felt as a waste of time to set about the search in any lengthy painstaking fashion. When, for instance, such an argument is met with as that "we ought to be guided by the decisions of our ancestors, for old age is wiser than youth," even the most cautious person can hardly help feeling a high degree of security in guessing that the operative cause has been some *misinterpretation* of the meaning of Reason or Thesis or both, whereby the full difference between 'ancestors' and 'persons old in age' has been overlooked. So again where we find it argued that 'every effect must have had a cause, since otherwise it would not be an effect,' we are, no doubt, justified in suspecting some attempt to argue in a circle. So in a considerable number of cases Common Sense can lay a

finger at once on the *cause* of the fallacy, and thus go to the root of the matter without elaborate inquiry.

A very little inspection of actual instances, however, will show that this is far from being always so easy. The causes of *Non sequitur* are manifold, and in the large majority of cases the same false argument may be due to one of several; and these, morever, not necessarily acting in isolation, but as a rule two or three combining to establish a false belief. A given fallacy may be partly due to misinterpretation of language, partly to forgetfulness of logical principles, partly to incomplete analysis of facts observed, and so on: the union of causes often makes their strength. Whether or no it is these difficulties, however indistinctly felt, that have led several writers to declare the systematic treatment of fallacies to be altogether hopeless, at any rate the facts have been distinctly recognised and deplored by others. Whately, for instance, writes, "It must often be a matter of doubt, or rather of arbitrary choice, not only to which genus each kind of fallacy should be referred, but even to which kind to refer any one individual fallacy." And he further speaks of the "utter impossibility" of framing any classification which shall be completely secure from this objection. Mill endorses Whately's opinion, but introduces into his own list of fallacies one class—those of *Confusion*—under which he says, "almost all fallacies might in strictness be brought. . . . A fallacy can seldom be absolutely referred to any of the other classes." The outcome of all which is, that it is very easy to give an

actual case of fallacy a wrong name, very difficult (hopeless except by means of special knowledge of the circumstances) to be sure that we have named it rightly; and quite impossible to guarantee that even the honest fallacious reasoner can be made, in this way, to see his error. We are led then to recognise 'Plurality' (and combination) of causes of *Non sequitur* as a fact, and to admit that any attempt to determine what has misled another person is open to exactly the same risks and difficulties as any other attempt to read our neighbours' thoughts or motives.

What is meant by *classifying* Fallacies or classifying anything? All classes whatever are formed not by 'Nature' only, but by ourselves reviewing the facts presented there, and wishing to sum them up conveniently for purposes of our own. Finding some point of resemblance between A, and B, and C, . . . we give them a common name, and thereby erect them into members of the class which the name denotes. This is never done without a purpose, however dimly conceived; and such purpose is, ultimately, always the comparison of new cases with those already known. Just where the possibility of identifying instances ceases, the value of any classification ceases too. The whole purpose of framing classes of fallacy is to enable us to compare any new instance of faulty argument with others already known to be fallacious,—if possible with the most simple and naked example of the class. And if our classes be such that the identification of actual instances is "a matter of

doubt or rather of arbitrary choice," or, as Mill puts it, if men's actual errors will not always or even commonly fall into our classes, the preservation of the names (unremedied and without full explanation of the limits of their use) is likely to lead to a very false sense of security.

To some readers it may seem unnecessary to raise difficulties over the confusion of *causes* of fallacies with 'fallacies' themselves; but the fact is, that there are few kinds of confusion that are really more difficult to avoid. The name 'Fallacy' is commonly used in at least four different senses, and before proceeding further there may be some use in setting these out, and choosing one of them. A 'fallacy' is used to mean:—

(1) A piece of false reasoning, in the narrower sense; either an invalid 'immediate inference,' or an invalid syllogism; a supposed equivalent form which is not equivalent, or a syllogism that breaks one of the rules.

(2) A piece of false reasoning, in the wider sense; whereby, from true facts, a false conclusion is inferred.

(3) A false belief, whether due to correct reasoning from untrue premisses (reasons or sources), or to incorrect reasoning from true ones.

(4) Any mental confusion whatever.

Now, clearly there is no guesswork required for saying what is wrong with a given immediate inference, or syllogism, expressed in full. It either is or is not

a case of 'undistributed middle,' 'illicit process,' and so on. But since, in practice, arguments are very rarely so expressed, we really run a considerable risk in accusing a reasoner of falling into one of these paralogisms. If, for example, a person appears to be using an undistributed middle term (as when he argues that some one who 'rushes in where angels fear to tread,' is therefore a fool), the error—if error there be—may really be due either to his ignorance of syllogistic needs, or to his mistakenly confusing the major premiss with its reciprocal ('all those who rush in, etc., are fools'), or to his mistakenly believing the reciprocal true; or, again, to some confusion as to the exact meaning of some of the separate words employed. And to accuse him of undistributed middle is, in practice, interpreted as judging that it was the first of these four causes to which the error may be definitely traced. That which is a fallacy in the second, third, or fourth senses above noticed may be no fallacy in the first sense; and similarly that which is a fallacy in the third and fourth senses may escape being so in the first and second; and 'mental confusion' is obviously wider than any of the other meanings, covering cases which they would allow to pass untouched. Hence, the narrower the meaning we give to the word, the more liable we become to the danger of undertaking to guess at the cause; and on this account it seems better to interpret 'Fallacy' in the fourth of the above senses.

There is indeed one way in which the old names,

or many of them, may be preserved with real advantage: and that is, not by simply deploring the difficulty of identification and then thinking no more about the matter, but by trying to understand clearly the causes of it. So far as we can obtain the *law* of the difficulty, we are in a fair way towards being able to judge in the given case whether and how far identification is possible. It is therefore on this account that I would draw attention to the risk of failure that is always run, for the sake of speed, in attempting to find at once the source of a given fallacy. However valuable such a practice may be for saving time, and however justified in certain cases, we must admit with Mill and Whately that there are many other cases where it necessarily fails. The remedy seems to lie, first in recognising clearly and consistently this possibility of failure, secondly in trying to improve our process of guesswork, and lastly in providing some surer if more lengthy method to fall back upon in doubtful or disputed cases, —wherever the matter is more important than the time. Such a method Logic really furnishes,—that of the Reduction to absurdity, * or, as it is more popularly called, 'pushing the argument home,' a method not by any means infallible, but free at least from the danger just referred to. Although Language remains faulty and treacherous,

* This is, however, to be distinguished from the process so-called by Euclid, which corresponds to the ancient "*ductio per contradictoriam propositionem sive per impossibile*," by which the moods *Baroko* and *Bokardo* were to be justified. See Aristotle: Top. viii. 14. See also p. 353 of this book.

and our knowledge of Nature incomplete, yet if this method be fairly and cautiously applied we thus avoid at least the too common error of dogmatically misreading the mental processes of other people.

This, then, will be the plan adopted; and having already recognised the fact that to guess at the source of fallacy necessarily exposes us to a certain risk of failure, the next point is to inquire what can be done to improve the methods of guesswork.

CHAPTER V.

THE EMPLOYMENT OF GUESSWORK.

I. General and Special Sources of Fallacy.

For the purpose of attempting to detect Fallacy off-hand, it is clear that some classification of fallacies is in the first place required: we must be able to give the detected fallacy a name. And the most obvious and useful principle of classification appears to be the attempt to distinguish (1) the main sources of danger to argument in general, and (2) the special dangers to which special forms of argument are chiefly liable. Some such principle, not perhaps always intentionally followed however, seems in fact to lie at the root of most of the distinctions which have been made by logicians, and equally of those which have won a permanent place in popular usage. Thus the great distinction made by Aristotle, between fallacies *in dictione* and *extra dictionem*, calls attention to one large general source of Fallacy,—the snares of language; while inside the second main class the varieties are partly common to all kinds of argument,—as the *Fallacia accidentis*

(interpreted widely), the *Ignoratio elenchi*, and the *Petitio principii*,—partly special to special arguments, as the *Fallacia consequentis*, the *Non causa pro causâ*, and the *Fallacia plurium interrogationum*. So again Mill's division into *a priori* fallacies and those of 'inference,' aims apparently at marking off in the first place a large source of error common to all forms of argument, while under the second head the same function is performed again by the class called 'fallacies of confusion,' the remainder of the second class being divided according to the special forms of Inference, namely Induction and Deduction. And when we look at the names of fallacies which are widely recognised in popular usage, this principle of classification is equally noticeable, 'verbal ambiguity,' 'missing the point,' and 'begging the question,' having come respectively from '*in dictione*,' '*Ignoratio elenchi*,' and '*Petitio principii*;' and such names as 'false analogy,' 'over-generalisation,' 'overlooking alternatives,' etc., referring more directly to failures in special kinds of argument.

I propose then to make some use of this principle of classification. In face of the difficulties to be encountered, a certain aid towards satisfactory guesswork may perhaps be given by examining broadly both the chief snares common to argument in general, and also those characteristic of the special forms or types of argument. And the discussion of both will, I hope, be of service towards appreciating the value and meaning of the method for reducing to absurdity.

II. A LIST OF GENERAL OBJECTIONS TO ANY ARGUMENT.

Probably if any one already accustomed to the practice of detecting Fallacies, but yet possessing a mind unburdened with the more abstruse logical technicalities, were asked to classify all possible objections to arguments in general, the division made would be somewhat as follows:—

1. That the Reason given (or the objection) is beside the point.

2. That the Reason given begs the question.

3. That some important factor has been overlooked or forgotten.

4. That if the argument be cogent, some absurdity (or at least untruth) must also be believed.

At any rate such a classification does not err on the side of too great depth or intricacy. Can it be made useful for our present purpose?

A note must be carefully registered, in the first place, that this division, however obvious at first sight, is purely one of convenience, not otherwise defensible. In strictness these four, if not quite alternative attacks, each equally capable of being made against any unsound argument, are at least to a very great extent overlapping. It will be seen that the first of these objections corresponds roughly to the charge technically known as *Ignoratio elenchi;* the second to *Petitio principii;* the third and fourth having received no technical names. But so

long ago as Aristotle's time it has been pointed out * that every case of *Non sequitur* may in one sense be viewed as *Ignoratio elenchi;* while it is quite clear that the first and second of the above heads are, strictly speaking, cases of 'Untruth implied.' If the Reason is beside the point, or if the sufficiency of the Reason itself depends on the Thesis being true, it is clear that the Thesis cannot really depend upon the Reason in the manner implied in every argument. As regards *Petitio principii* it would, no doubt, be considered rather a straining of language, were we to claim that the other heads might be brought under it: and yet, in this rather far-fetched sense the name *Petitio principii* is sometimes employed,—at least in cases where the point is missed and in those in which some palpable absurdity is implied. For when we give as valid a reason which is beside the actual point at issue, we beg (not indeed the *expressed* original question, but) a question then perhaps for the first time seen to be remotely involved in it and essential to its establishment; namely, that of the connexion between the Thesis which is, and that which ought to be guaranteed. This may be seen, for example, in the case where metaphor or analogy is employed in argument: to the assertion that the growing size of London bodes evil to England because London is the heart of England, and a swollen heart is a sign of disease, it is clearly optional whether we object that "R is beside the point, *because the analogy does not in fact apply,*" or that "R

* Soph. El. vi.

begs the question *how far the analogy holds good*, which is the real turning-point of the argument;" or, again, that R and T together imply the absurdity (or untruth) of *supposing what is in fact a mere metaphor to bear literal interpretation*. In all three cases the objection is fundamentally the same, and our adoption of one form or another depends solely on rhetorical considerations. Again, where a Reason is given which, taken together with the Thesis, leads to absurdity or untruth, we sometimes hear the objection brought that such Reason begs the question by assuming the fact on which the question is plainly seen to turn. As De Morgan says (*Formal Logic*, 255), though he strongly objects to the nomenclature—"It is the habit of many to treat an advanced proposition as a begging of the question the moment they see that if established it would establish the question." R is accused of covertly assuming the truth of some highly doubtful proposition which is plainly required to establish T. So again it is open to us to view any case of palpable question-begging as 'beside the point,' inasmuch as it provides no real evidence in support of the point actually in question. If for the Thesis 'War is unjustifiable' the Reason be given 'We ought not to do evil that good may come,' it is quite optional to object, either that 'this begs the question whether war is, on the whole, an evil,' or that 'the maxim is an excellent one in itself, but beside the point in the present case, since war is *not* necessarily a doing of evil.'* And lastly it does not need any lengthy

* Readers who have been interested in the formerly disputed question

exposition to show that in all cases where Fallacy has crept into an argument, some relevant fact, whether as to things or as to the meaning of names, has been overlooked. "We might, perhaps," says Mr. Sully,* "characterize all illusion as partial view," and elsewhere he identifies illusion, at bottom, with fallacious inference.

In spite of such difficulties, however, this fourfold division may be put to considerable use in guessing at the seat of Fallacy. But it will need some special

whether or no the Syllogism itself is a *Petitio principii*, will easily see the connexion of what has just been said, with that ancient difficulty. Every Syllogism runs a risk of being in fact a *Petitio principii*; it is so unless the argument employing it either appeals to *admissions already made* (thus becoming a legitimate *argumentum ad hominem*), or else only aims at forcing into explicitness a principle, or an application of a principle, on which the point at issue turns,—in order that the material truth, as yet supposed capable of disbelief, of such principle or application may be now inquired into. If I argue that A is B because A is C (or because C is B), the Syllogism employed is, of course—C is B: A is C: ∴ A is B. In using this Syllogism I may be either appealing to a *former* admission that C is B (or that A is C), or I may wish *now* to obtain that admission, and then the further consequence that my thesis is true; and lastly I may either try, consciously or unconsciously, to hide, or may openly confess, this wish. Supposing the Reason itself true, the whole question of the truth of the Thesis *turns upon* the truth of such further assertion implied by Reason and Thesis together, and to 'assume' the truth of such further assertion is, no doubt, to 'assume' that upon which the question really turns. But there are two kinds of assumption—underhand (or unconscious), and open,—and it is only the former which can do harm. A Syllogism rightly employed is just as much, and no more, an assumption of the point in question as every *express assertion is*. If I assert that A is B, I 'calmly assume' that such assertion is true; but I do so in a manner which, if my assumption is not supported by an appeal to valid reasons, exposes me at once to the necessary hostile criticism. If the view here taken of the burden of proof be a correct one, it is only covert assumptions which are illegitimate.

* *Illusions*, 2nd ed. p. 336.

care in keeping the classes distinct. We shall have to limit the meaning of some of the names, in a way which their etymology at least would hardly warrant.

III. THE OBJECTION *IGNORATIO ELENCHI.*

First, it should be noticed that the common application of the terms *Ignoratio elenchi* and *Petitio principii* is rather uncertain. As regards the former, we have already seen that in one sense it may be stretched to cover nearly every possible fallacy, while in another sense it is often narrowed to misinterpretation of the meaning of the Thesis. A third sense, rather wider than this last, is simply the objection that *owing to some confusion or other* as to meaning, the Reason is accepted as a guarantee for the Thesis, when in fact either this actual Reason at most guarantees some other proposition merely resembling the Thesis and mistaken for it, or when some other proposition merely resembling R guarantees this actual Thesis. When the charge 'R beside the point' is brought, in the sense here referred to, what is meant is that owing to some misunderstanding, *whether of R or of T*, the former is unduly accepted as a guarantee for the latter. To use an expression of Mr. Milnes'—"The journey has been safely performed, only we have got into the wrong train."

If we accept this meaning, the next thing is to distinguish carefully two cases of misunderstanding; first where, without any opponent as yet in existence, an

assertor brings forward, in support of his Thesis, some Reason which, though really valid for some other (similar) Thesis, is strictly irrelevant to the present purpose; and, secondly, where the misunderstanding takes the form of an *objection* by an opponent, to an assertion made, or an argument employed, by ourselves. It is in the former of these two cases that the chief practical difficulty is to be found, but in both cases the difficulty is considerable.

In no department of logical practice, perhaps, is the danger of undue dogmatism so great as in that of deciding whether misinterpretation has really taken place. This is, in fact, the chief point at which the functions of Logic are apt to be confused with those of Grammar. Since in any advanced language there is much substantial agreement both as to the meaning of names and of forms of speech, and since in such languages Grammar is always at hand to confirm and to generalise this agreement as far as possible, there springs up easily the supposition that meaning resides solely *in* the words and their arrangement, that a printed sentence bears its full interpretation on its face, which has only to be deciphered and the thing is done. But, as a fact, interpretation is far from being so simple a matter: the same meaning may be expressed in many different forms, and the same word or set of words may carry many different shades of meaning. If any doubt be felt on this head, let the reader take any collection of ordinary examples of proposition, *e.g.* those in chaps. iii. and iv. of Jevons' *Studies in Deductive Logic* (and these, be it remem-

bered, are always artificially straightforward), and ask himself in how many of the four traditional forms (A, E, I, and O), each will bear interpreting. Still more uncertain is the meaning of the separate *names* employed. A few there are, as already noted, the sense of which is, practically, fixed; but these are comparatively few. Not only does the meaning of most words in common use undergo a constant gradual change as time goes on, but at the same period it varies greatly according to the varying knowledge, or even the passing emotions, and physical states, of the speaker; and much of what every one 'knows' he is liable to forget. All names which have gathered round them a cluster of inveterate associations (and what names have not?), depend for a large part of their essential meaning on the past experience, and present mental states and habits, of the person using or hearing them. Many words bore a different sense to ourselves as children from that which they bring to us later in life: though the old names and phrases may remain, their meanings grow and alter widely. So again, a slight difference in the context, or even in less obviously connected circumstances, will often make a difference of meaning amounting to the actual reverse of that conveyed by the same words at another time: witness the possibility of "damning with faint praise," or the wrath of authors whose sentences have been criticised apart from their surrounding explanations. We need not search further for illustrations of so trite a fact. The purpose of these remarks is merely to bring

to mind the many-sided difficulties attending all attempts at finding the exact meaning of an assertion.

To all this it may, however, be answered that, just as in deciding whether a proposition is real or not, so in deciding the total question of its meaning, the only feasible plan, where doubt exists, is to put questions until such doubt is removed. It is here, in fact, that the practical value of the third 'Law of Thought'—that of Excluded Middle—comes into operation. That Law, regarded as a statement of fact, is of course the barest truism,—A is either B or not-B: everything is either something, or something else. But its value, in this connexion, springs from the fact that, having postulated this undeniable truth, we gain the right * to require from a speaker the answer Yes or No to any intelligible question † put about the meaning of a name or other form of speech. "When you say that Solomon was wise, do you mean wise according to our present standard, or some other?" "When you say that familiarity breeds contempt, do you mean that in every case the maxim

* It is very difficult to avoid using expressions which, strictly interpreted, may seem to refer to some set of artificial rules for debate. It is, however, possible, I hope, to keep these convenient expressions, and yet strain all such meaning out of them; using them only for brevity. Strictly, of course, we have no 'right to require' any answer at all: what is meant is only that if no answer is forthcoming, the argument falls through, since either the Thesis or the Reason remains 'unreal' *to us* who ask the question.

† It should be noticed that if A sometimes means B, and sometimes not, the question, "Do you mean A or not?" becomes no longer intelligible.

holds true?" "When you say that some Irish are industrious, do you mean that the majority are idle?" When an hon. member said that the House of Commons is 'largely composed of English gentlemen,' did he mean to imply that it is not entirely so composed? There is no limit to the possible varieties of question that might be put, and wherever the question itself is intelligible, only the two answers—Yes or No—are possible, and one or the other must be true. Where doubt arises as to meaning, therefore, we have this method at hand for removing it.

But the chief source of misinterpretation is the fact that such doubt does not arise as freely as could be desired. We do not habitually weigh either our own assertions or those of other people—life being short, and occupations various,—but are content to throw our words out somewhere near the mark, and to seize the gist of what is said; glad if we escape the grosser kinds of inaccuracy. Very likely there are excellent reasons for this practice, but it has its dangers also; and it is about the dangers only that we are here inquiring. Apart from the plan of systematic questioning, can anything be done to avoid misinterpretation?

Much may be done, no doubt, but not in the shape of a few plain rules. To deal with the pitfalls of language at all fully, at least a separate volume would be required. In one sense, indeed, the subject is inexhaustible. No one can pretend to be perfectly safe from all danger of misinterpreting language until he can claim a complete

knowledge of all nameable *things*, and also entire freedom from all effects of our ancestors' mistakes in naming; and, so far as this goal remains at present unattained, so far there exists a source of misinterpretation against which nothing can securely guard. It is true, no doubt, that there are many errors in interpretation which spring, at least directly, not from imperfect acquaintance with the things that bear the names, but from ignorance of the principles of naming, classifying, and defining, from too careless employment of language, or from too ready subservience to its tyranny. But the task of completely remedying even these defects is a somewhat more extensive one than can be here attempted, except by means of occasional and indirect suggestions.

It is obvious, further, that if there is to be an absolutely clear mutual understanding between speaker and audience as to the meaning of every separate word employed, and also of the assertion as a whole, a larger part of every speaker's life would be occupied in the process of defining, or explaining his statements, than could well be spared from his other occupations; and that, long before the meaning of most assertions could be settled, their value as practical information would have passed away. Accordingly, the point of first importance for practice is to know on what principles the compromise had better be conducted; when once there is seen to be need of inquiry into the special meaning given to some word or phrase, the process of inquiry is simple enough,

and has been already sufficiently indicated. To a definite question a definite answer may be, with reason, demanded.

Where there are already two opponents, though *Ignoratio elenchi* is unfortunately common enough, it is far less dangerous than in the other case. As a rule, when we are met by opposition we are ready enough to discover any misunderstanding of our views. The grosser cases, at least, therefore, would present no difficulty: it will be sufficient to call to mind a few of the leading varieties. Thus, mildly denying that a certain thing is absolutely all-important, we are met by arguments to show that it has some use: boldly pointing out that something else is altogether valueless, we are met by the answer that we 'can't expect perfection:' asserting that some doctrine lacks arguments to prove its truth, we are referred to excellent reasons for believing in its utility: endeavouring to trace the manner in which some highly developed growth (*e.g.* conscience) originated, we are supposed to be refuted by a mere description of its present nature: disputing an argument, or an instance, we are supposed flatly to deny the theory in support of which these were brought forward: making some merely tentative suggestion we are asked for definite proofs. The varieties are endless, and the reader's experience will easily supply him with a longer list of instances than we need here set out.

But the real importance attaching to this kind of *Ignoratio elenchi* begins when we reach the finer shades

of it. There is no doubt that the most frequent cause both of real misunderstanding and also of interpretation which is only too penetrating, is the attempt to read between the lines of what is said. Time being short, it seems to be generally recognised that some ellipsis in expression may as a rule be expected. It saves time and trouble in many cases to go behind the actual words, answering not what they strictly say, but what the objector supposes they really intend to insinuate. There are familiar euphemisms, for instance, whose ironical meaning is hallowed by custom; and there are ways of saying much by saying little,—and *vice versâ*.

But probably the most dangerous of all the sources of misunderstanding, is the gradual change that unavoidably takes place in the accepted meaning of words, so that both old and new meanings are, for a time at least, left existing side by side. The most marked examples of this are perhaps those due to the influence wrought on language by Science, or the deepening of knowledge, on the one hand, and by the allegorical or superficial spirit on the other; very many words possess in this way no less than three broadly marked meanings,—the scientific (or technical), the popular, and the poetical. The various meanings in which the familiar word 'Law' is used, will perhaps sufficiently illustrate what is here intended. Or again, through what is loosely called mere lapse of time, the meaning of a word may wholly alter; as the word 'Sophist,' originally from σόφος, has now come to mean a quibbler. A public instance of *Ignoratio elenchi* due

to this latter cause, was presented in a recent trial.* "It was complained," said counsel, "he had written 'I never expected to hear a coxcomb ask two hundred guineas for flinging a pot of paint in the public's face,' but . . . . what is a 'coxcomb'? *I have looked out for the word and find* that it comes from the old idea of the licensed jester, who wore a cap and bells with a cock's comb in it. If that is the true definition, Mr. Whistler should not complain." So in, perhaps, the majority of cases where Etymology is relied upon by an afterthought as giving the 'true' meaning of a word at the present day, there is involved some attempt to use the word in one meaning and to defend it in the other.†

We have already had occasion to notice George Eliot's reference to "those undeniable general propositions which are usually intended to convey a meaning very far from undeniable," and it is not only general propositions but *general names* also that are used largely in this manner. The meaning of any name consisting, as it does, of very many particular facts regarding the objects named, it becomes easy on occasion to forget conveniently some of these facts while *defending* our use of the word, although we were far from forgetting them in the meaning really

* *Whistler* v. *Ruskin.*

† *Cf.* Geo. Bentham, *Outline of a New System of Logic.* "Where correct information, and consequently perspicuity in language is the object, the greatest attention should be paid to employ, in preference to others, such figures as have by long use lost, as it were, their original sense." *Cf.* also H. Spencer, *Psychology*, vol. i. p. 97. "The best words are those from which long use has worn away all, or nearly all, traces of their origin."

intended to be conveyed. The gathered associations, for instance, which words take on, and which they are sure to convey when used, can be very easily left out of sight while defending our use of them. This is especially insidious in the case where the meaning of the word used is relative to some standard, and where truth or falsehood depends upon the standard taken. As marked instances may be mentioned 'good' and 'bad,' 'great' and 'small,' 'hot' and 'cold,' and all names which confessedly indicate points variably selected on a scale. In its finer shades the danger is almost ineradicable, since the standard employed by different people in judging is apt to vary with their personal peculiarities, temporary or habitual, and past experience; so that where no thermometer can be appealed to it becomes exceedingly difficult to fix any objective standard at all. Even if we understand our intimate friends, it is notoriously difficult to make full allowance for difference of standard in the case of all our casual acquaintances.

It is easy, however, in this manner to enumerate a few of the leading ways in which assertions may be misunderstood, and even to write a loose and general homily upon human liability to error in this respect. But there seems to me very little practical value in so doing. The practical question would be,—What is it incumbent on us to do, for the purpose of detecting, and so avoiding, misinterpretation? And to answer this with any real completeness would lead us further afield than we can here afford to go.

But as regards the first of the two kinds of misunderstanding, it may perhaps be suggested as a broad general rule that inquiry into meaning, for the purpose of raising the objection that R is beside the point, is only advisable where the person inquiring has himself a definite view, if not of all the possible ambiguities involved, at least of the fact that some given ambiguity is probable. It is true that in this way much false argument would pass unnoticed, but the only alternative seems to be a loss of more time than the results would probably justify. If in every case where an assertion is made and grounded, it were to become at once incumbent on us simply to assume, until the contrary was shown, that some irrelevance was present between R and T, it is clear that the waste of time would be on the whole enormous. Although *Ignoratio elenchi* may be the commonest of all fallacies, and although, perhaps, some slight shade of uncertainty as to our meaning is present in nearly all assertions actually made, nothing would, I think, be practically gained by treating intelligent assertion as the exception, verbal confusion as the rule. There should be something to set us on the track of an *Ignoratio elenchi;* we should not be left under the necessity of inquiring for it at large.

If this be admitted,—and I see no resource but to make the admission,—it follows that the power of guarding against this kind of mental confusion is not one which can be given in a few hours or days, by the careful study of any dissertation on the subject, however

searching and complete. It must be rather a growth, dependent on the growing power and habit of *distinguishing* between the different senses which any given word or phrase may bear. It is the power of seeing *difference* that is of prime importance,—difference, in this case, between one possible meaning and another. And the power of seeing differences cannot be obtained by merely recognising its value, though that is no doubt one important step towards the attainment of the power.

As regards the second kind—that which more truly corresponds to the literal meaning of *Ignoratio elenchi*, —it may also, I think, be laid down that the assertor is, in every case, the arbiter of what he means to say. Where, under cross-examination, he contradicts himself, or shifts his ground, this can be pointed out, and the request can be made that he will abide by one alternative or the other. He either means a given thing or he does not. There is no middle ground between 'Yes' and 'No.'

IV. THE OBJECTION *PETITIO PRINCIPII.*

A similar difficulty exists in fixing the meaning of *Petitio principii*, to that noticed already in the case of *Ignoratio elenchi*. De Morgan observes* that "Aristotle hardly ever uses the phrase ἀρχὴν αἰτεῖσθαι, *principium petere*: it is Τὸ ἐξ ἀρχῆς, and Τὸ ἐν ἀρχῇ, that which is (ought to come) out of, or is in, the prin-

* *Formal Logic*: p. 256.

ciple. By the word *principium* he distinctly means *that which can be known of itself.*" . . . "Among the earlier modern writers, as far as I have seen them, there is some diversity in their description of the *petitio principii.* That the *principium* was meant to be the thing known of itself, the ἀρχή of Aristotle, as far as the introduction of the word is concerned, seems clear enough. Was it not then by a mere corruption that it was frequently confounded with the conclusion, the 'quod in *principio* quœsitum fuit?' Did not the same inaccuracy, which confounds the Τὸ ἐν ἀρχῇ of Aristotle with the ἀρχή itself, govern the change of the word? Most writers take the fallacy of the *petitio principii* as meaning that in which the conclusion is deduced either from itself, or from something which requires proof more, or at least as much, *ignotius, aut æque ignotum.*" And De Morgan's own opinion seems to be (*ibid.* p. 254), that "strictly speaking, there is no formal *petitio principii* except when the very proposition to be proved, and not a mere synonym of it, is assumed." Nothing, however, appears to be really gained by restricting the name to so small a compass as this; and there is no doubt that such a restriction would be very much at variance with the popular acceptation of the term. Still, some restriction seems needed, or else, if we define it as 'covert assumption' in general, it is difficult to say where the application would really stop. Although, even on so wide a view, deductive proof would not be a begging of the question, since there the turning-points of the argu-

ment are openly appealed to; yet, on the other hand, we should have to say that question-begging in its finer shades begins where there is even an unconscious fear of allowing Principle and Application to stand their trial.

Question-begging, then, as we shall understand the term, never arises except in two cases; namely, (1) where the relevancy, and (2) where the truth of R is already called in question, and where in answer to such objection, some proposition equivalent to (or including) the original T is given in support. Of the first of these cases, an example given above (p. 169) may be taken as fairly typical,—"Every effect must have a cause (T), since otherwise it would not be an effect (R)." We have seen that to call in question the relevancy of the Reason is, in other words, to ask for the missing premiss required for full Demonstration, and here it is plain that this can only be the original Thesis itself—"Every effect must have a cause." For if it be possible that an 'effect' should happen without a cause, then the special signification which the name 'effect' is employed to bear would be lost, and its value as a label would accordingly be spoilt. Hence in order to complete the formal cogency of the argument, we need the material truth of the Thesis,—which is just the point at issue. For the second case we may take as a conspicuous example the dialogue given by Whately in illustration,—but somewhat altered and shortened:—

"'Every particle of matter gravitates equally.' [T].
'Why?'

'Because those bodies which are heavier always contain more particles, even if more closely condensed.' [R].

'How do you know that?' [*i.e.* 'I doubt whether R is *true*.']

'Because, all particles of matter gravitating equally, [original T] that mass which is specifically the heavier must needs have the more of them in the same space.'"

It is seldom, of course, in practice that we find *Petitio principii* thus openly relied upon. Actual arguments are usually longer, more complex, and less explicit, than those which are required for illustration. As Whately puts it, "A very long discussion is one of the most effectual veils of Fallacy. Sophistry, like poison, is at once detected and nauseated when presented to us in a concentrated form; but a Fallacy which when stated barely, in a few sentences, would not deceive a child, may deceive half the world if diluted in a quarto volume." But it is by seeing any fallacy in its nakedness that we can best learn its central nature, and hence the need of sometimes appealing to examples which are so obvious as to be free from serious harm. The real difficulty, for practice, always lies in the stripping off disguises, and reducing what is said, and urged, to T and R.

And here, too, when we raise the all-important question as to the means of deciding in practice whether question-begging has in fact taken place, we become extremely liable to the danger of accusing an opponent unjustly; for the means of escape are numerous. Take for instance, the following argument of Mr. Jernyn to Felix Holt: "You must permit me to check your use of the word 'bribery.' The essence of bribery is that it should be legally proved. Unproved bribery does not

exist." Here we may, perhaps, have a very strong suspicion that the Thesis is needed to support the Reason. The Thesis evidently is "This case ~ (*i.e.* differs from) bribery;" and the Reason "Bribery ⟶ judicial conviction thereof," (the further assertion being "This case ⟷ judicial conviction of bribery.") It seems almost quixotic to hesitate to accuse the speaker of begging the question, for it is clear that if this case *is* bribery (which is the point at issue) the Reason must be untrue, — provided, at least, as Felix Holt would certainly have admitted, that no judicial decision had yet been given against the case in question. And yet, if we accuse Mr. Jermyn of begging the question, he has an easy escape. "I mean," he would say, "to assert in the plainest language, that it is little short of libellous to accuse another person of bribery without bringing legal proof to support such accusation." This may, it is quite evident, have been his real intention in the speech. That is, his speech may have been an *Ignoratio elenchi* so far as the question bribery or no bribery is concerned. But by treating the argument in a less hasty manner, the covert assumption may be prevented quite as effectually and without running the risk of mistaking the speaker's intention. "Do I understand you to assert," we might ask, "that if A pays B for his vote, no bribery has been committed, unless and until the fact is proved in a court of law? If such a transaction does *not* in itself deserve the name of bribery, what name does it deserve exactly? It is of

such transactions that I wish to speak, whatever their name may be."

So far as question-begging may be due to misinterpretation of the language used, the difficulties are of course the same as those briefly noticed in the preceding section. But more commonly it is the result of much the same state of mind as that which leads to Platitude. We have already had occasion to notice the nature of the harm done by tautologous propositions and circular explanations, and since Proof is the counterpart of Explanation, and every argument merely a complex proposition, it is easy to see the fault of circular Proof. If we start with the implied supposition that the Thesis is true, it is obvious that the more correct the subsequent logical process, the more certain shall we be of reaching the required result. Such Thesis has therefore had no fair trial: its supposed 'proof' has been a pretence. Essentially the same, too, is that commonest and most insidious of all practices, the employment of what Bentham called "question-begging names." If a name properly belongs to S, the whole meaning of that name is applicable: but, at the same time, if *part* of the meaning is plainly applicable, we are apt to suppose that the name may be 'properly' applied. In this way the leap from part to whole is easily made, and the assumption hidden.*

* This form of *Petitio principii* is of near kindred to False Analogy (see p. 265), and also to material untruth of the minor premiss in an ordinary deductive argument. The difference is, in fact, like that between analogy and metaphor, a gradual difference, depending on the degree of explicitness merely. In the deductive argument we rest our

It is not, however, only when we wish to deceive, nor even only when we use words carelessly, that this danger arises: for the number of words that have gathered no associations—especially associations of praise or blame —is comparatively small, and with the best intentions and the greatest care it is difficult to avoid all taint of question-begging. It is through the power of these associations to prejudge a question that so much importance is attached to the exact name given, even by a person who is himself fully capable of using words as counters merely: in the absence of a colourless word, and in the presence of two words highly tinged with opposite colours, he is forced to choose that which will mislead the least. "It is said that we have failed in Ireland. I do not admit the failure. I admit the success to be incomplete." In the same way, the choice between 'reigning' and 'governing,' between 'sovereign' and 'suzerain,' between 'mob-rule' and 'popular government,' between 'liberty' and 'license,' between 'famous' and 'notorious,' and between endless other pairs of alternatives, may often lead to unavoidable unfairness, or at best to a rough balance between opposite wrongs.

The remedy is essentially the same in this case as in all other cases of *Petitio principii;* and, in a wider sense, in all cases of fallacy,—the forcing into daylight that which would prefer obscurity. Names in themselves

case quite openly on the disputable premiss that 'S is M;' in the argument from analogy we suggest 'S is, *as it were*, M,' or 'practically the same as' M; while, if we desire to beg the question by means of a name, we assume as quietly as possible that the name applies.

are harmless so long as their misleading associations can be kept away from them, and by putting the point-blank question whether or no this or that meaning is intended, the assumption, if any, may be compelled to produce its credentials, or to confess that these are wanting. More than this Logic can never do. A fallacy stopped at one moment may always bide its time, and come into operation again when the incident has been forgotten and the pressure removed: and, as just seen, this is a danger which all names that are rich in gathered associations especially tend to foster. On this account it is that in cases where, as so often in Politics, the determination is strong on both sides to take every possible advantage, however unfair, there is often practically no better resource, even in the interests of truth and fairness, than to meet question-begging with its own weapons, just as one false analogy may often be met and destroyed by another equal and opposite. In this way, out of two wrongs a rough and ready right may be made to emerge. But here we certainly step over the line which divides Logic from Rhetoric, or the task of detecting and recognizing Fallacy (or, as an alternative, preventing it for the moment) from the wider problem of counteracting its operation.

CHAPTER VI.

THE EMPLOYMENT OF GUESSWORK: CONTINUED.

I. The Objection 'A Factor overlooked.'

It is difficult to find any one short name which shall fairly describe the third of our four general objections to an argument. We have already noticed that in the ordinary sense of the words, some important factor has been overlooked or forgotten wherever any fallacy—even *Ignoratio elenchi* or *Petitio principii*—has been committed; so that the name here taken is too vague to be really descriptive. And the same difficulty seems to attach to any other short name that can be suggested; thus if, for example, we attempt to sum up this third objection as the charge of 'superficiality of view,' it will be necessary to add that the 'view' spoken of may be either a view of objects, qualities, and events, directly, or a view of the meaning of names and propositions. For sometimes, in proving, we make use of knowledge already formulated, and sometimes we go direct to the facts for ourselves: while, according to the special mode of argument employed, will be, to some extent, the special liability to error.

Without, then, spending time in trying to get a perfectly accurate name for the purpose, it becomes necessary now to examine, briefly at least, the leading types or forms of argument, noticing the points at which they are specially vulnerable, and the special form which the objection may take. And in spite of all difficulties and complications, it will be found that the possibilities of fallacy are, fundamentally, fewer and simpler than might at first be supposed. Although the kind of argument employed may to a great extent be used as the key in guessing at the seat of possible error, yet the value of the key will be much increased by recognising the essential similarity of dangers which thus take on somewhat different forms.

II. THE TYPES OF ARGUMENT.

§ 1. *Introductory.*

In reducing the almost endless variety of possible arguments to a few generalised types, it must be remembered that these can only stand, towards the arguments actually found in use, in somewhat the same relation as the 'roots' of language are (by some) supposed to stand towards modern forms of speech. That is to say, the forms of argument now commonly in use are, for the most part, much more complicated than these types; and yet, in spite of all their complications, they are capable of analysis; the roots, however modified and combined, can still be discovered in them.

Without some such artificial simplification of the inquiry, it would be practically impossible to find a path at all securely through the maze of details presented; and with due precautions there need be no more danger in this expedient than in any other employment of the generalising or simplifying process. If, as is frequent in real life, a given argument employs in combination several of these typical forms, it is only by guarding against the dangers to which each part of the complex whole is separately liable, that we can take the whole in hand. Failing some method of the kind, we should require so large a number of special rules of evidence that to frame, to grasp, or to handle them effectually would be far beyond our power. It is probably already beyond the conceit of all but the most contented ignorance. The purpose of thus reviewing the fundamental types of argument is, then, that we may be able to catalogue their special dangers, so that, meeting with any argument, we may obtain some guide to the points at which to look for weakness: and, at the same time, it is intended to bring these special dangers under a more general view.

§ 2. *Demonstration and Real Proof.*

For such a purpose, however, many of the distinctions made, both in the traditional logic and in common usage, may be left out of consideration: for example, the distinction between 'Demonstration' and other kinds of Proof.

'R,' it will be remembered, means 'Reason (or reasons) actually given;' and R may therefore either contain in itself both Principle and Application, or may express (or even suggest) only one of these, leaving the other implied. In other words, the proposition R $\longrightarrow$ T, implied in every argument, may mean one of two things:—either (1) that R includes T in its *meaning*, so that R being given, T may be known by a mere process of interpretation: or (2) that the truth of R may be accepted as a sign that T is able to stand against adverse criticism. In the former case, the argument is technically called a 'Demonstration,' or complete Syllogistic proof; in the latter case there is, I believe, at present no strict technical name, but for our present purposes I propose to call such arguments (by far the commonest in practice) *Real* arguments, whether *empirical* (including *analogical* and *inductive*) or *deductive*. The distinction between Demonstration and Real Proof bears a certain likeness to that between Tautologous and Real propositions, already discussed (p. 42). Just as in the one case the proposition as a whole gives us no more information than is conveyed by the S alone, so in the other case the argument as a whole makes no real advance upon the Reason given.

The name Demonstration is perhaps not quite free from ambiguity. The popular notion of its meaning seems to be much the same as 'unanswerable,' or 'conclusive,' or 'complete.' When the illogical person finds some theory no longer defensible, he not unfrequently

takes refuge in the disclaimer, "Of course I cannot *demonstrate* it, with mathematical certainty: the case does not admit of demonstration"—thereby implying, amongst other things, that if it were 'demonstrable,' there could no longer be any question raised about its truth, and that all that the disputer has done is to demolish this impossibly perfect kind of certainty, leaving the *practical* certainty intact. In this sense, probably, the following passage was written,—"However much one may be unable logically to demonstrate that there is such a thing as luck, there can be no question as to the fact of its existence." If the word 'demonstration' means anything, it is thought, surely it must mean complete and *conclusive* proof. And hence, by a curious piece of inconsistency, the name often works round again, in popular usage, to mean proof which is 'sufciently' or 'practically' conclusive;—as, for instance, in the case of a criminal caught redhanded in the act, whose guilt would be commonly said to be 'demonstrated.'

Complete and conclusive, in a manner, Demonstration (in its technical meaning) certainly is. It is formally complete, and it is conclusive as against all who admit the material truth of the premisses. It is, in fact, an unanswerable *argumentum ad hominem*, and, so far as mankind agree about the truths which may be unquestionably accepted, so far but no further reaches its universal binding force. Hence its especial connexion, in the popular view, with mathematics,—the simplest

example of its operation. The axioms of mathematics do not need to be reconsidered (even if we have the power really to do so), and so far as Demonstration appeals to them, so far it is conclusive as against all of us. But wherever any premiss, whether in a Demonstration or in other kinds of Proof, meets with any doubt as to its material truth, the conclusiveness of the argument depends entirely on such doubt being cleared away: a preliminary question is raised, which, unless answered satisfactorily, will destroy the material cogency of the Demonstration. Hence the real force of Demonstration rests ultimately on the same basis as that of all other kinds of argument, and reaches exactly the same level of objective cogency. Demonstration says, in fact, 'You admit the truth of the thesis indirectly, since you have already admitted the truth of this and this, which together include or imply it.' For, unless the premisses are supposed to be admitted true, to assert them as unassailable reasons for believing the conclusion would clearly constitute an insidious kind of 'begging the question at issue.' On this account, therefore, Demonstrative Proof is, as a rule, less easy to obtain than Real Proof; for to obtain it, means, in fact, to obtain a person's consent to the conclusion without his knowledge.

If there were any firm and sharp line to be drawn between absolutely binding proof, and proof tainted with human fallibility, each kind standing on opposite sides of a clear-cut chasm, then the name Demonstration might indeed be applied in its dictionary meaning. But as it

is, the limits of 'axiom' and theory' are too ill-defined and undefinable, one man's meat in this respect being too often another man's poison. Even our senses—that is, our 'direct perceptions,' which always include an element of inference,—are, it need hardly be said, liable to illusion: much more so is the complicated mental process by which we recognise a 'fact' as conclusively certain. Many an innocent person has before now been "caught redhanded in the act." Accordingly, the nearest approach which we can make towards applying the name Demonstration in its etymological meaning, and at the same time preserving its definiteness of outline, is to employ it for the kind of certainty which, though materially fictitious, is formally complete; which, though not guarded absolutely against all possibility of error, is guarded against it *on condition* of the premisses being materially true. And it is probably on this account that the name has been in Logic technically restricted to complete Syllogism.

Technically then only those arguments are demonstrative in which the thesis is included in the *meaning* of the reason or reasons given. Logical necessity is merely the necessity of avoiding self-contradiction, for the purpose of preserving a consistent meaning: 'necessary truth' is merely truth which is already *admitted* in another (usually a more circuitous) form. Thus the truth that two and two make four is already admitted in the full definition of the terms employed. If at least there be anything more in 'necessity' than is here

claimed for it, it is something of no importance to our present purpose.

Strictly speaking, Demonstration is of two kinds,—Immediate and Mediate (without or with a 'middle term'*). Hence I have said in the last paragraph 'reason or reasons.' But in practice, when challenged to prove an assertion, one has seldom the chance of appealing to a simple equivalent form which is already admitted true; for the obvious reason that 'immediate inference' is so extremely easy that the person admitting the equivalent form is not likely to challenge the thesis itself. Mere rarity of occurrence would indeed be no ground for neglecting all exposition of this mode of proof, if it were not for the fact that indirectly we have already had plentiful occasion to exhaust the subject so far as our purposes demand. The sole equivalent form of any proposition, apart from such equivalence as is merely due to synonymous words or to variations in grammatical structure, is that already spoken of under the 'Law of Counter-indication,' and it seems unnecessary to add that any assertion includes a denial of all other assertions that conflict with it: so that the Aristotelian proposition I is included in A, and O in E; for this is implied in the full interpretation of the Maxims of Consistency.

Now when the Reason contains expressly both a principle and an application of that principle to the case in hand, it is clear that nothing more remains to be done than to confront these two elements of R at once with

* See pp. 234, 239.

observed or admitted fact. That is to say, the operation of Logic as regards the original Thesis is at an end, and all that remains to be done is to erect, if necessary, these two elements (the Principle and the Application) into theses themselves. But occasionally it happens that such complete Demonstration is erroneously supposed to be present: and then we have *either* what is sometimes called a 'Syllogistic fallacy', *or* some misinterpretation of the language used, *or*, thirdly, the vague intention of raising merely a 'presumption' in favour of the Thesis. It is by no means always that we can tell with even approximate certainty which of these three causes has been in operation,—often all three have had a share. Aristotle indeed declares that in his day even a mathematician * might be deceived by the argument, "Every figure has its three angles equal to two right angles: for every triangle has its three angles, etc., and every triangle is a figure:" and in Plato's *Republic* we frequently find such arguments admitted as valid: but this after all amounts to no more than saying that inconclusive demonstration was then in fact often accepted for conclusive,—a proposition true of modern times also: as to the exact *cause* of such acceptance, that is another matter.

Completely demonstrative arguments, or those even pretending to be such, are, however, the exception, not the rule. They are, in fact, seldom employed in serious reasoning (outside certain departments of mathematics) but are nowadays chiefly confined to cases where some

* Soph. El. vi.—καὶ οἱ τεχνῖται καὶ ὅλως οἱ ἐπιστήμονες.

more or less ingenious quibble is plainly intended,—as in "Dry bread is better than wisdom: for dry bread is better than nothing, and nothing is better than wisdom." The almost universal practice in these times is to save circumlocution by giving as Reason *either* the Principle *or* the Application (more commonly the latter), but not both together. In the case of 'chain arguments'—perhaps the commonest arguments of all—the Reason becomes as a rule still more elliptical; for we there give expressly neither the Principle itself, nor its application, but merely the Reason which appears to be chiefly needed in support of one of these. Take for instance the not very complicated argument in favour of Home Rule in Ireland, that "Federalism is the finished product of civilisation and political ingenuity," and consider the further suppressed links required to complete its cogency. Three at least may be at once very easily distinguished, —the Principle that "to be the finished product of, etc., ⟶ desirability," and two other propositions to complete the complex Application of such principle to the present case,—"Home Rule ⟶ separation of Imperial from National and Local questions," and "separation of, etc., etc., ⟶ Federalism,"—none of which appear in the express statement. In many actual arguments, of course, the suppressed links are far more complicated, as in— "Tithes really fall on the landlord; for the rent of tithe-free land is higher than that of land of the same quality and the same advantages of position subject to tithe,"— where a considerable amount of special knowledge of

the subject is required in order to properly disentangle all the propositions implied.

These chain arguments need not, however, become in any way a stumbling-block; since where we do not at once see all the hidden implications, there is a very simple means ready at hand for arriving at them. However many links there may be, they are all capable of being summed up in the concise expression—

$$\left\{\begin{array}{l}\text{"If R then T, and}\\ \text{If not T, then not R,"}\end{array}\right\}$$

and we have only to call for the grounds on which this proposition is believed, in order to have the links set out as fully as we need. "How does R prove T?" we ask. Thus in the example just given a person entirely ignorant of all the ordinary conditions of the tenure of land, and of all the deeper facts brought to light by Political Economy, would be as capable as any one else of erecting into a new T the *connexion between the R given and the original T:* it would take him longer, of course, to arrive at the rights of the matter than it would take another person who had already considered some of the questions involved, since he would have to push inquiry further back towards first principles; but his present ignorance of the subject is only a temporary and removable bar.

Such then being the difference between Demonstration and the other kinds of Proof, it is clear that in treating the opportunities for error that occur in the latter we really treat those that occur in both. If, when either Principle or Application alone is given we can

recognize the needs of formal adequacy sufficiently to avoid accepting as further assertion a supposed Application or Principle which does not really apply, *a fortiori* we are guarded against accepting two insufficient premisses when both are expressed. We shall accordingly dismiss all consideration of Demonstration as such, and confine attention to the forms and the dangers of what is here called 'Real Proof.'

§ 3. *Induction and Deduction.*

In the chapter on the Process of Proof in general,* it was seen that the real foundation of Proof is always the recognition of resemblance and difference between things or events known, or observed, and those which are on their trial, whether such recognition is based on knowledge already reached, and formulated in names or propositions, or on direct observation and experiment. In proportion as we openly and distinctly refer to known principles—already generalised knowledge—is Proof *deductive:* in proportion as we rapidly and somewhat dimly frame new principles for ourselves from the cases observed, is Proof *inductive, empirical,* or (in its loosest form) *analogical.*

The whole history of the rise and growth of knowledge, it has been also already remarked, is a record of fruitful rivalry and interaction between two opposite processes. Observation of facts has demanded theory—

* Part i. chap. v.

statement of 'laws' or uniformities—to explain, and even to name, the things and events observed: theory in its turn has always been more or less liable to the purging criticism of 'fact.' In the strictest sense, of course, Deduction and Induction are modes of *Inference*, not of Proof at all. Strictly speaking, all Proof, so far as really Proof, is deductive. That is to say, unless and until a supposed truth can be brought under the shadow of some more certain truth it is merely self-supporting, or circular. Unless we have some more comprehensive and better tested generalisation within the sweep of which to bring our thesis, we reach no foundation broader than itself; no assurance beyond what may be derived from the fact that nothing has yet been found to contradict the theory. But yet there is a meaning in the distinction, and, with certain limitations and apologies, I propose to make some use of it. Although the dependence of any Thesis on its Reason must be *rationalised—i.e.* must have the underlying principle made clear—before the testing operation can be called complete, yet in regard to special dangers it makes considerable difference whether the principle is at first definitely apprehended or not,—whether (as it is commonly expressed) the Proof *professes to rely* upon Laws known or supposed to be true, or upon facts observed or supposed to be observed. We must distinguish then, as far as possible, between that kind of Proof which rests openly and distinctly upon already generalised knowledge—Deductive Proof,—and that which rests upon what may be loosely described as 'isolated facts,'

or 'perception of resemblance and difference,' or 'observation and experiment,' or 'circumstantial evidence,' or however the phrase may run,—that which is commonly known in its highest form as Inductive Proof, and in its lowest form as the Argument from Analogy.

The required limitations in preserving the distinction appear to be, in the first place, a clear recognition that although in Induction the Principle, or Law, connecting the cases observed with those inferred is *in the case of Inference* commonly dropped out of sight, or at least left highly indistinct, yet the whole cogency of Inductive *Proof* depends upon the extent to which such Principle is first rendered definite and then confronted with observable or admitted fact. So long as the Principle is left indistinct, we may be fighting under false colours—misled, that is, by false analogies, or hampered by distinctions without a difference—in extending our knowledge to the supposed 'parallel cases,' or in drawing our line exactly where we do. There is, in fact, probably no more fertile source of real (as opposed to merely verbal) fallacy than just this neglect, or dread, of 'rationalising' our beliefs,—of bringing their underlying principles out into the daylight. The name Inductive, then (as also 'empirical' and 'analogical'), is properly a name of a mode of *Inference*. It describes the fact that in arriving at our Thesis the Principle *was* left more indefinite than if we had reached the Thesis deductively. The provinces of Analogy, Induction, and Deduction are thus merely rough divisions on a scale: the more definite the

Principle the more the inference possesses the deductive character, the less definite the nearer it approaches to loose Analogy. But equally in deductive and in analogical arguments, in order to rationalise the belief the underlying Principle must be made definite. The chief value of the distinction, for purposes of Proof, is that it serves to call attention directly to that part of an argument which stands in pressing need of careful examination: meeting with an empirical argument we may often shorten the process of testing it by inquiring in the first place what the underlying Principle really is,—how far it will bear reduction to definiteness and comparison with fact. Empirical arguments are, too, so far as empirical, free from mere snares of language,—which play so large a part in all deductive proof: their chief danger may be summed up as the adoption of some theory without examining, or perhaps even seeing, the alternatives. But this will be more fully discussed presently.

The second difficulty in preserving the distinction lies in the fact that as a rule the Empirical and Deductive processes are found in combination, both being employed on the same subject-matter. Not only does Inductive Proof—in its higher forms—make large use of Deduction, for verifying the hypotheses put forward, but all Proof, however professedly deductive, is in the habit (at least where the generalised knowledge is not very firmly established in the individual mind) of drawing much confidence from successful prediction, and even from merely congruent facts. Some Free-traders, for

instance, lacking robust faith in the abstract propositions from which that theory may be deduced, or failing to hold them clearly in memory, are apt to feel an accession of security when statistics 'prove them right;' and weak or vague generalisations, such as that 'Roman Catholicism and national poverty go hand in hand,' commonly draw what strength they possess jointly from the two sources, prejudice (*i.e.* 'known law') and observation. It would certainly be hard to find a single instance of *inference*, within historic times, in which we could say beyond all doubt that Deduction was wholly wanting or had contributed nothing to the belief; and since any of the causes of a belief are liable to be relied upon as reasons on reflection, it is rare to find professed empirical proof entirely free from the deductive element.* Sometimes, no doubt, from one cause or another, either method may dwindle into insignificance beside the other. A great many people, for instance, are inclined to settle the claims of ghost stories deductively;—partly perhaps because they find as a rule that their hands are more or less hampered and their eyes rendered more or less useless, before they are allowed to begin experimentation. On the other hand, in Meteorology, from a deficiency of known laws we are thrown very much upon bare facts

* Even in attempted *Proof* we commonly find the two processes mingled, as where Parson Lingon argues in favour of cock-fighting, not only that under it "England had been prosperous and glorious," but that "the practice sharpened the faculties of men, gratified the instincts of the fowl, and carried out the designs of heaven in its admirable device of spurs."

as recorded in statistics; what certainty we have regarding the weather is mainly empirical. In all cases of real proof, however, it is probable that nowadays both processes play some part.

These two considerations make it, of course, extremely difficult in practice to label every argument at once with one or the other name. Sometimes, as where the Reason is a direct statement of the Principle itself, or again where it consists of a record of some experiment, no hesitation need practically be felt as to where the danger lies; but in a large number of cases we have no means of deciding whether the argument may best be classed as empirical, or deductive, or both.

In those logical treatises in which Inference and Proof are not clearly distinguished, and where consequently the distinction between Induction and Deduction occupies a very prominent place, there seems to be a desire to restrict the name of Inductive Proof as far as possible to the establishment of *laws* by means of isolated facts, Analogical Proof to the establishment of *facts* by means of resembling facts, and Deductive Proof to all other cases. But we have seen that both Principle and Application are required for all completed proof whatever: that is, until both are brought to daylight and examined, the testing of the Thesis remains unfinished. Sometimes —*i.e.* in Demonstration—both Principle and Application are expressly given by the Reason; at other times one or the other only. But yet it will not do to say that wherever the Principle is merely implied we have a clear case

of Empirical Proof, since it is sometimes through extreme familiarity, rather than through insufficient definiteness, that its statement is suppressed; as where we argue "The Pope is fallible, since he is human." In many such cases the Principle relied upon might well be definitely enough apprehended to warrant our calling them cases of deductive proof.

What then, it may be asked, is left of the distinction at all? Have not these innocent limitations and apologies in fact proved too much? If we cannot tell for certain in the given case whether the argument is properly an empirical one or properly deductive, why keep the names and make a pretence of using them?

In the first place, we are here intentionally seeking to make the best use of the guesswork system of detecting Fallacy, and with that view may be thankful for even rough distinctions suitable to the purpose. Nor, because the distinction breaks down when pressure is put upon it, need we consider it wholly worthless. It possesses a solid core of applicability, and if we can be content to use it as a rough guide in finding the weak point of an argument, much value may still be extracted from it in economy of time.

Again, if the names Induction and Deduction make us think of Inference rather than of Proof, we are not obliged to use them. However we choose to name the two different kinds of arguments, the distinction between them has a certain real importance, as already shown; and all that is intended to be done with it is to recognise

that so far as the given argument may be seen to belong to one or the other class, so far we are already some way on the track of 'special dangers.'

A thesis, then, whether abstract or concrete, is sometimes supported by bringing forward a *congruent fact*, or a number of congruent facts: in this case the thesis, when abstract (as *e.g.* the law of Gravitation, or of Natural Selection) is usually called a *theory*. An abstract theory is offered both as an explanation of the facts on which it rests and as a means of prediction in the future, thus basing a general law upon individual facts observed. When the thesis is concrete it is rarely called a theory, but professes to argue direct from case to case, by what is called Analogy, or Resemblance, or Extension to parallel cases.

Or, secondly, a Thesis, also either abstract or concrete, is sometimes supported by appealing, expressly or otherwise, to an already recognised law. Here the Thesis (except when explanatory) is not as a rule called a theory, —probably because that name carries with it by custom a shade of uncertainty, which seems to throw unnecessary doubts upon the 'already-recognised law:' it is occasionally called a 'deduction,' but more often has no distinctive title. As to the nature of the Reason, sometimes the law itself is expressly mentioned, but more commonly the S of the thesis is labelled with some name, or said to have acted or suffered in some particular way which is 'known' to carry certain consequences. In other words, whenever the Thesis professes to be deduced from some already-

framed law, the Reason either expressly mentions this law, leaving its application implied, or it appeals to some *sign*, expressly asserted to be present in the given case, leaving the universal trustworthiness of such sign implied.

Accordingly, the two main kinds of argument may be called respectively the Argument by Example and the Argument by Sign. In the former we rely primarily on 'facts' observed, no law to cover the case being as yet distinctly admitted; in the latter we make use of the recognised results of past observation, whether registered in express propositions or merely taken for granted in the meaning of the names employed.

§ 4. *Certain Minor Distinctions.**

Before further subdividing these two main forms of argument, it will be well to notice briefly certain other distinctions which are sometimes made, but which mark differences that are quite unimportant for our purpose. Thus we have seen that the distinction between *conclusive* and *presumptive* proof, though useful perhaps before inquiry begins, is altogether too loose for adoption into Logic. In one sense no proof is conclusive, in another sense unless proof professes to conclude the inquiry it is not proof at all. Really, the distinction seems to be

* This section contains several technicalities which could not be explained, or omitted, without considerably lengthening the exposition, and it seemed desirable to save space as much as possible, since the section is not essential to the main thread of our subject. The technicalities can be easily found in any logical text-book.

intended to mark roughly the difference between a Thesis asserted and one that is merely suggested; and such hesitating theses lie quite outside our present interests. Further, certain names, such as *circumstantial evidence*, are almost synonymous with others that will here be employed; empirical evidence including circumstantial evidence as the whole includes the part. Again, 'testimony,' 'hearsay evidence,' etc., though marking distinctions valuable perhaps for some purposes, are varieties which do not readily admit of any special treatment, except where there exists, as in Law, some authority competent to lay down strict rules with a merely average balance of good result. Logic is less pressed for time than Law, and can afford to decline to generalise where generalisation is only so roughly justified.

Again, there is the distinction between hypothetical arguments and those which are commonly called categorical. A hypothetical argument, of whatever kind, is simply one in which the major premiss (the Principle) takes the form of a hypothetical proposition. The difference between a categorical and a hypothetical proposition is, we have seen, merely a grammatical one, conveying at least no difference of meaning that is of importance to our view of Logic. Any categorical argument may therefore be expressed in hypothetical form, and *vice versâ*. While, however, the danger in hypothetical and in categorical arguments is essentially and fundamentally the same, the language in which it has to be described is, under the predication view, somewhat

different. The hypothetical proposition divides into Antecedent and Consequent more naturally and readily than into S and P, and accordingly the 'middle term' of a hypothetical argument is hard to find,—or rather it seems almost a straining of language to call it a middle term at all.* In a categorical argument the middle term of the Syllogism involved is often difficult enough to disentangle clearly,† but since in hypothetical arguments the middle 'term' is itself a proposition, namely, the Antecedent (or, for a negative conclusion, the denial of the Consequent) of the Principle, any search for the middle term, as such, is more often a source of confusion than of help. In fact, in all cases of difficulty, translation from the categorical into the hypothetical form will, I think, be found the easier plan, for then we have merely to see whether or no the minor premiss properly affirms the Antecedent (or denies the Consequent), or improperly denies the Antecedent (or affirms the Consequent). The fallacy of 'affirming the Consequent' in hypothetical argument is essentially the same as that of employing an 'undistributed middle' in a categorical one; and in like manner it may be shown that 'denying the Ante-

* See also Bain's *Logic*, bk. i. chap. iii. sect. 30.

† As, *e.g.* in the argument from difference—*Cesare* or *Camestres*—where, in order to bring M to the position required, we have to contrapposit the major premiss. Let the T be 'Whales are not fishes,' and the R 'they cannot remain always under water,' the principle involved is clearly, 'Fishes proper *can* remain, etc.;' but it is only in the contrapositive form—viz. 'That which cannot remain, etc., is *not* a fish,' that we can bring the middle term into the position required.

cedent' is essentially the same as 'illicit process of the major.' But in order to describe the danger in these cases in the words that are most simply and naturally applicable to them, it seems better to preserve the distinction, merely noting that it is of grammatical rather than logical interest.

Of further varieties of argument the complete list would be a very long one. Numerous small distinctions, unnecessary for our purposes, have been made from time to time. Thus we have the nineteen valid moods of the Syllogism (several of which never really occur in practice), or again the argumenta *ad personam, ad verecundiam, ad populum,* etc.—names which imply a large amount of insight into other people's motives. As regards the Syllogistic moods, while preserving to some extent the differences on which they are founded, we may reduce their number considerably. In fact, under the liberal treatment here adopted towards the exact words in which any assertion may happen to be clothed, some simplification in this respect follows of necessity. Thus, while we shall be obliged * to take some account of the difference between an affirmative and a negative Thesis, we do not need to distinguish in every case a negative proposition, as understood in the Aristotelian scheme, from a positive one; and again, every 'particular' proposition, so far as it makes a tangible assertion at all, is negative in our sense. A negative proposition, as we have elected to understand it, is only a proposition which

* See p. 243.

intends to deny some positive assertion already made or believed, not every proposition which happens to contain the negative particle, in however close connexion with its verb. The traditional mood *Celarent*, for example, is probably hardly ever used for Disproof, *Camenes* probably never used at all. And, as will be seen later,* all the fourteen syllogistic moods with the conclusion in I or O may be conveniently reduced to two.

The remaining distinctions we shall have to make will be entirely within the two main types, the Argument by Example, and the Argument by Sign; and they are set out in a table (IV.) in the Appendix (E), which may be usefully kept in view during our discussion of the special types of argument.

§ 5. *The Argument by Example.*

What is here called the Argument by Example, or by 'Congruent Fact,' is not quite the same as that which is commonly known as Proof by Circumstantial Evidence, though closely similar: on the surface at least, the latter mode of argument relies upon facts (*i.e.* circumstances) which together *confirm* the Thesis. It is difficult, indeed, to say precisely what is 'commonly known' under the name Circumstantial Evidence, since popular usage seems to vary. The common acceptation of the term is, however, almost certainly, somewhat narrower than that to

* Cf. *infra*, p. 241, and Appendix (Ç).

which its literal (*i.e.* derivational) meaning would point. Literally, circumstantial evidence should include, one supposes, every case of proof from the circumstances (or aggregate of isolated facts) observable or known: so that (1) a geological explanation, founded on Nature's foot-prints, or (2) our opinion of a neighbour's character, founded on his general conduct, or (3) a political prediction, founded on the signs of the times, or (4) any law of nature, founded on wide observation and experiment, would all equally come under the title. But no doubt such an employment of the term would be considered a straining of language. The name circumstantial evidence shows a decided tendency to restrict itself, in common usage, if not solely to the case where a crime is traced home to the criminal by means of the marks that he (or his act) has left behind him, at any rate to proof of the *cause* of a concrete fact where the evidence of eye-witnesses cannot be obtained, and where the circumstances are singly weak. In Law, of course, the reason for the importance given to this distinction is mainly the recognition that 'facts may bear more than one interpretation,' while direct testimony is, in the large majority of cases, free from all danger except that of deliberate perjury.

Under Proof by Example, however, will be here included all cases where a proposition, whether abstract or concrete, is supported by the production of a fact, or of facts, which are simply given as agreeing with the theory, or as forming cases under it, when at the same time it is

recognised that there is as yet no definitely known Law in the matter, to which appeal can be directly made. The primary danger in all such cases is the same,—namely, that the fact or facts produced will admit of some other interpretation than that put upon them by the theory. But this danger takes certain special shapes, which it will be worth while to consider more in detail. The subdivision to be made under the Argument by Example is that into :—

(*a*) The Argument by Analogy.

(*b*) Proof of a Generalisation, by the facts which it is intended to explain.

The first of these is what we have already had occasion to notice (p. 104) as 'extension to parallel cases;' the second embraces what are commonly known as the problems of Induction,—so far as Proof is concerned.

(*a*) *The Argument by Analogy.*

Analogical reasoning, or the argument from indistinct resemblance, is one of the most difficult subjects to treat with satisfactory completeness, since arguments of apparently the most diverse forms are apt to contain more or less of it, and on the other hand we rarely meet with a case of open reliance on Analogy pure and simple. That is to say, where we do find Analogy unmistakably employed, there is also commonly a strong inclination either to soften the force of the assertion made in the Thesis, so that the process should be viewed less as an

attempt at proof than as a mild suggestion; or else to put forward the analogy rather by way of illustration than as evidence.

It was not without a reason that we avoided choosing a symbol for the assertion of *indistinct resemblance* between S and Ƨ. For *essential* resemblance, it will be remembered, we found* a symbol (the now familiar $\longrightarrow$); but for the too common assertion 'S is strikingly like Ƨ,' our scheme provides no place. The reason is that this vague assertion can only be conceived as acquiring a practical value for Proof (valuable though it may always be for Discovery) by emerging from its safe obscurity through the claimed resemblance ceasing to be any longer indistinct.

Resemblance, it is on all hands admitted, varies in degree. A given individual, we say, for instance, is more like his father than his mother; distantly resembles a cousin; and still more faintly, a stranger, a savage, or some particular animal. A cloud in the sky may bear a fancied resemblance to some familiar object, but not so close a resemblance as one pea bears to another. Now the only manner in which gradual variation can be represented seems to be by means of numbers,—or at least of pictures with *measurable* proportions,—and measure implies the conception of relative number. Hence, it seems, we are driven to say that resemblance varies in some manner expressible (if at all) by means of numbers.

* See p. 64.

To meet the needs of accurate comparison, we have accordingly established the familiar phrase '*points* of resemblance.' John resembles his father in the eyes, or hands, or hair: he has his mother's accent, and a touch of his grandfather's gout: holds the same opinion as his friend on a certain important question; has a less hasty temper than his enemy; and it is in 'expression' only that he resembles a mastiff or a bull.

But what are these so-called 'points'? Are they simple units, which have only to be counted, for and against, in order to work the sum by straightforward addition and subtraction? I fear it is not always easy to avoid all taint of this plausible error. Accurate measurement seems at first sight to demand equality of units.

The fact appears to be, however, that no so-called 'point' of resemblance or difference is known to exist which is not in theory further analysable, and few that are ultimate even to the naked eye. The colour of the eyes, for example (to choose out of the list just given the point which seems on the whole least likely to yield further component parts), may be broadly classed as blue or brown or black and so on; but it can hardly be disputed that between these rough distinctions, endless shades of difference are possible. As for accent, liability to gout, similarity of opinion, or of temper, or of expression, each of these is plainly seen to be built up of innumerable components; the numerical difficulty is only verbally solved and really shelved, by determining to treat any given 'point' as ultimate.

If we cannot then arrive at valuable results by simply counting the points of resemblance and difference, as we count black and white balls in a ballot-box, what other resource is open? Only one; namely to estimate as well as we can their relative *importance* as regards the matter in hand. For this purpose the phrase '*essential* points' has been invented. 'Essential resemblance' means 'resemblance in the point (or group of points) M,* which is essential;' and by essential is here simply meant 'sufficient to prove a certain other assertion' to which reference is thus indirectly made. Without this indirect reference to some further proposition, the phrase 'essential resemblance' becomes, not perhaps quite meaningless, but deprived of any meaning that exists in definite shape: for to reduce it to definiteness would be just to state wherein the essentiality consists. It has been sometimes said, for instance, that the State essentially resembles a family; and vaguely every schoolboy can see the likeness at once. But beyond a mere oriental delight in simile for its own sake; and beyond the hazy satisfaction which is still apt to follow even the cheapest attempt to classify; when we push the question home, and ask what exactly is intended to be conveyed by the assertion, we find ourselves really hoping, by means of the asserted resemblance, to register our right of arguing (within certain indefinite limits) *from* family *to* State;

* The symbol M (Middle term) is here chosen in reference to the manner in which the fundamental structure of the analogical argument corresponds to that of the *deductive* one. See also pp. 232, 234.

that is, of saying that since some given assertion may be made about the former it may also be made about the latter. It is this further assertion, whether clearly apprehended as the purpose or (more commonly) not, to which the 'essential' refers: and an 'essential point' is a resemblance or difference, wide or narrow, complex or apparently simple, that may be used as a sign of the truth of such proposition.

As yet, however, the difficulties in fully understanding the analogical argument are hardly more than begun. And first, as to the symbolic expression; here some care is needed in order to avoid ambiguities. It clearly will not do to use S and $\mathfrak{S}$ as the terms of *both* propositions, the Thesis and the Reason; but with the aid of the symbol Z in addition, we can sufficiently express all that is necessary. If we also use the symbol —— for Relation *in general*, the universal form for the analogical argument would run as follows:—

(Thesis) S —— Z; for
(Reason) $\mathfrak{S}$ —— Z.*

This, it must be confessed, just as Mill's formula on which it is based,† is a statement simplified artificially to the utmost. An actual analogical argument may be

* It should be noticed, however, that this formula is only valid on the condition that the symbol —— means approximately the same in Thesis and Reason.

† Mill's formula is stated, however, as if discovery, not proof, were chiefly contemplated. It runs, "Two things resemble each other in one or more respects; a certain proposition is true of the one, therefore it is true of the other."

complicated by failure of complete identity between Z in Thesis and in Reason, or even perhaps between the respective copulas.* Or again, Analogy is very commonly employed as part of a full deductive process, as in "Colonies ought not to rebel against the mother-country, since they are (*so to speak*) its children, and (*it is an accepted law that*) children ought not to rebel against their parents." Every kind of argument, in fact, may have an analogical element in it, and wherever the analogical element is present the danger is to that extent the same. But this special danger will be spoken of later; at present we have only to set out and describe the various kinds of argument.

A more serious difficulty may be stated as follows: If, as appears, what is really relied upon in the argument by Analogy is a supposed 'essential resemblance' between S and $\mathfrak{S}$, and if by essential resemblance is meant resemblance in the point M, such point being claimed as a *sign* for the purpose required; wherein does the attempt to prove by analogy differ from the purely deductive argument? Clearly, it may be said, unless the resemblance is declared essential for the purpose in hand (*i.e.* for proving the Thesis), there is nothing to show the relevancy of the argument; until the points of resemblance are recognised as such, how can we even begin to inquire whether they are important or wholly trivial; and if their possible triviality is still an open question, whence our confidence in their binding force?

* The 'copula' is the sign of relation. See p. 54.

The answer must be that this is exactly the question which Logic has to put to the person whom an analogy convinces. The difference between the analogical and the deductive arguments is a difference in the degree of distinctness with which the existence of the link M, and the fact of its being a truly important link, are recognised and appealed to. We need a name by which to describe the cases where these two oppertunities for error have been left to take care of themselves,—where ready and generous faith, rather than the cold and grudging spirit of strict inquiry, has been in operation,—and for this purpose the name Analogical Reasoning has won a firm place in our terminology. By analogical reasoning we denote what may be called embryonic deductive arguments,—arguments which are as yet in happy unconsciousness of the troubles in store for them later.

The solution of the seeming paradox is therefore not difficult to find. The argument from analogy is, properly speaking, not so much a mode of attempting proof, as a mode of attempting to dispense with the serious labour of proving. It lies at that end of the scale of cogency which is furthest from Demonstration. Instead of winning its results openly, in the face of hostile criticism, it prefers the easier course of simply claiming already to hold them safe. It is only this claim which causes the puzzle just noticed; we are apt to forget that a claim may be made without any valid foundation.

In this connexion, there remains one further difficulty, though not of any great importance. It will perhaps be

doubted at first sight whether the analogical argument should properly be considered to come under Proof by Example as here understood; since, the Thesis being itself the 'theory,' the Reason is not a 'fact agreeing with the theory,' *except on condition* that the analogy holds good; which condition cannot be simply taken for granted without begging the question. '$\mathfrak{S} \longrightarrow Z$' (*e.g.*) is only a fact agreeing with the theory that $S \longrightarrow Z$, on condition that there *is* essential resemblance between S and $\mathfrak{S}$; and the question whether or no this essential resemblance exists is just the turning-point of the argument. But the reason for treating Analogy as Congruent Fact is that inasmuch as the employment of an analogical argument implies in itself that the analogy is supposed (by its employer) to be a valid one, wherever analogy is appealed to as proof it is clear that R is *given as being* a fact agreeing with the theory; inasmuch as the case given is supposed by the arguer to be a case in point, the argument is brought forward as resting on a fact agreeing with the theory.

The central type of Analogical reasoning is, then, that which we have already briefly noticed above as 'Extension to parallel cases.' Case S and case $\mathfrak{S}$ being seen to be 'similar,' a certain assertion true of the one is supposed to be true of the other. If the sugar trade is to be protected, why not the iron trade or the cotton trade? Since the Irish Church has been disestablished, why not the English Church also? Such examples as these, however, lie on the borderland between the

arguments from analogy and from sign. The technical distinction between the argument from analogy and the deductive argument from sign or mark (or middle term) being that in the former the exact points of resemblance and difference between the things compared are admittedly not yet distinct, it follows that so soon as the details of resemblance become clearly recognised as a warrant for considering the cases parallel, these points of community become at once a *sign* relied upon, and the argument rises to the deductive rank. Thus in the instances just given, if the sole (or sufficient) point of resemblance claimed be the fact that both are trades or that both are national Churches, then the assertions that the sugar trade ought not to be protected or that the English Church ought to be disestablished, are based no longer on mere analogy but on implied *principles* under which they are brought by means of the respective signs or middle terms. The case of the sugar trade is in this way referred to the recognised principle that protected trade is on the whole uneconomical; the case of the English Church is referred to a precedent supposed to have been created (*i.e.* a principle supposed to have already received tacit recognition) by what has gone before.

(*b*) *Proof of Law from Fact.*

The second mode of Proof by example is where the example or examples given are not supposed parallel cases to the theory, but instances, and if possible 'cru-

cial'* instances, of the operation of the supposed law. And, first, there is a further simplification to be made, after the pattern of that used by Mill in framing a universal formula for Analogy. The generalisation which appeals to facts as evidence may, as we have seen above, either be expressed directly as an abstract proposition, or lie hid under cover of a concrete or abstract-concrete one. The attempt to prove, for example, that S (a known concrete event) *was* causally connected with $\mathfrak{S}$ (whether the latter be also known to have existed or not) by means of some fact merely agreeing with such theory,—such as that S immediately preceded or followed $\mathfrak{S}$, either in this case or on past occasions—belongs properly to this mode of argument just as truly as the attempt to prove by the same means the simple direct generalisation that S *is* (in general) thus causally connected with $\mathfrak{S}$. In other words, the evidence produced for any assertion may conceivably be (is sometimes) of an empirical kind. In supporting any variety of thesis, the exact law, or outcome of conflicting forces, relied upon, may be so dimly conceived that to call the process in its present stage deductive would be to confuse a very important distinction, while any attempt to search first for the faults to which deductive proof, as such, is mainly liable, would be a waste of time.

This being the basis of the distinction, we shall find

* A crucial instance, in its modern sense, may be defined as any *single* instance deemed sufficient to prove a law: as in many cases of Proof under the method of Difference. See Appendix (B), p. 346.

that, in attempting to frame a typical formula for the inductive argument, it is best to take for the Thesis an abstract proposition. Not only are such arguments the kind in which the evidence is as a fact most frequently empirical, but that in which it is most rightfully so: since a concrete proposition that rests on merely empirical grounds has, and is widely recognised as having, a merely provisional support; while it is equally clear and also sufficiently widely recognised that our deepest basis for abstract law is concrete fact. To deal with concrete subject-matter successfully, in the complexity in which it actually occurs,—which complexity is ever becoming more manifest as our view opens out and hidden differences come to light,—we need at least some glimpse of the uniformities concerned, some knowledge of what may be expected *a priori*; and this whether the concrete Thesis is explanatory, classifying, or predictive. In practice it is safe to say that wherever a concrete Thesis is supported by appeal to congruent facts alone, the first step towards testing the value of the evidence must be to get the supposed underlying laws clearly stated; and that where an abstract-concrete proposition is thus supported, it is the abstract element in it which stands first in need of proof.

After what has been already said on the subject of Analogy, this more direct kind of generalisation needs little further preliminary notice. Whereas in analogical reasoning the leap from one supposed parallel case to the other is made with only a dim recognition of the law

(M ⟶ Z) which should bind the cases together, here we have the law itself directly set up as Thesis. ⨌ has been observed in a certain connexion with Z, in certain circumstances which seem to warrant our saying not only that when (if ever) we meet with ⨌ again we may look for Z, but that M was that particular element of ⨌ which was essential, and that the wider law M ⟶ Z can hold its own against all but unpractical doubts.

Any 'thing' we like to name,—let us here name it ⨌—is analysable into component circumstances. Let ⨌, for example, be that event called the arrival of a ship at St. Kilda. Some time ago "it was a general belief at St. Kilda that the arrival of a ship gave all the inhabitants colds."* Let 'unusually numerous colds among the inhabitants' be represented by Z. The inhabitants, then, we are told, commonly believed the truth either of the simple law ⨌ ⟶ Z, or possibly (if the material framework of the ship itself be denoted by M) the law M ⟶ Z. But this easy explanation did not satisfy Dr. John Campbell, and he began to analyse ⨌ a little more deeply, and to ask what distinguishable circumstances there were, forming part of that which was broadly described as 'the arrival of a ship;' and after taking "a great deal of pains" he ended by explaining it "as the effect of effluvia arising from human bodies." We are not told more definitely what he meant by this, or why the arrival of a single ship at the harbour should

* Dr. Paris, *Pharmacologia*, p. 89, quoted by Prof. Fowler, *Inductive Logic*, p. 310.

mean so great a difference in the amount of effluvium in the island, but at any rate such was his explanation; and if we denote 'effluvia arising from human bodies' by N, the law at which he arrived was either 'N $\longrightarrow$ Z,' or '$\mathfrak{S}$, when N, $\longrightarrow$ Z.'

Dr. Paris, however, either himself discovered, or at least quotes and endorses the discovery of, *another* element inseparable from $\mathfrak{S}$, and in his view more important as regards Z. This was the fact that "the situation of St. Kilda renders a north-east wind indispensably necessary before a stranger can land." Let N.E. wind be represented by O. "The wind," he adds, "not the stranger, occasioned the epidemic;" or, in other words, he views the real law as O $\longrightarrow$ Z. This law, it may be usefully noticed in passing, was not then *discovered* for the first time. O was already known as a *vera causa* of Z, while M and N were not. If we had no known laws already, discovery of explanations would be a slower process than at present. But Dr. John Campbell had left the supposed law in an unsatisfactory condition: the assertion $\mathfrak{S}$ N $\longrightarrow$ Z was in possession, and it had to be made to face a hitherto unsuspected alternative,—that which Dr. Paris suggested.

It seems hardly necessary to remark that the symbols M and Z were only chosen in order to show more clearly the connexion between Induction and Analogy. But in framing a formula for the inductive argument, we may now return to S and $\mathfrak{S}$, without any danger of misinterpretation. I do not see how to put the whole inductive

argument into symbols; but we may state it in a conveniently short form as:—

S (universally) $\longrightarrow$ $\mathfrak{S}$: for here are (one or more) cases of which this law is the best explanation: proper precautions having been taken against all rival theories.

The discussion of these proper precautions will be more in place when we speak more directly of the dangers of Empirical proof. At present there remain the deductive arguments to set out.

§ 6. *The Argument by Sign.*

In speaking of Analogy, we have already sufficiently noticed the indistinctness of the line between this and Deductive Proof, and the manner in which the analogical argument becomes deductive as soon as the points of supposed resemblance between S and $\mathfrak{S}$ are definitely apprehended as a warrant for the inference. And just as the analogical argument may apply to any kind of subject-matter, so may the strictly deductive argument. We may attempt to prove or to disprove either an abstract or a concrete proposition, and either an explanatory, a classifying, or a predictive one, by means of a definite middle term. And, further, the nature of this middle term, or link, must also already be sufficiently obvious. If it is to be really a link, it must be a *sign*; or, in other words, it must be known to us (or expressible) as the S of an assertive proposition.

It remains to be added, however, that although in every deductive argument M *may* certainly be viewed as a sign, this is not always the most direct description of it that can be given. Various types of deductive argument are distinguishable, and it is only where the Thesis is affirmative that we really gain much by resting our case on plain, straightforward indication. Thus, where the Thesis is 'S (or This S) $\longrightarrow \mathfrak{S}$,' if we know already the law that M $\longrightarrow \mathfrak{S}$, M is well described as a mark or sign which it should be our aim to show that S possesses. And, on the other hand, if 'S $\longrightarrow$ M' be given as a reason, the relevancy of such reason plainly depends on the trustworthiness of M as indicating $\mathfrak{S}$. This formula, it will be seen at once (namely 'S $\longrightarrow \mathfrak{S}$: for S $\longrightarrow$ M, and M $\longrightarrow \mathfrak{S}$'), corresponds to the ancient syllogistic mood *Barbara* (or to *Celarent*, where the E conclusion is affirmative in the sense here used *), or, in the language of the hypothetical syllogism, to the *modus ponens*.† Our known law is that 'if or wherever M can be indicated, $\mathfrak{S}$ is indicated also,' and our application is that here, in the case before us (namely S), M can be indicated.

But take next the case where the thesis is an 'Assertion of Difference,' as S $\sim \mathfrak{S}$: here the word 'sign' (in its ordinary restricted meaning, at least) is far less directly applicable. To the deductive argument to prove

* See pp. 65, 66, 73.

† Where M is negative (*i.e.* in the disjunctive argument), this is called the *modus tollendo ponens*.

such a thesis, the name 'Distinction by point of difference' seems better applied: two 'things' are seen to be distinct, since one has, while the other lacks, a certain quality. For example:—

"The release of the Kilmainham prisoners was *not* a case of 'paying black mail:' for now, sir . . . what is paying black mail? To pay black mail is to give something that you would not otherwise give. Are we going to do so?"

And according as S or $\mathfrak{S}$ is the possessor of the quality, we get two slightly different formulæ:—

(*Cesare*) S $\sim$ $\mathfrak{S}$: for S $\longrightarrow$ M, and $\mathfrak{S}$ $\longrightarrow$ non-M:

(*Camestres*) S $\sim$ $\mathfrak{S}$: for S $\longrightarrow$ non-M, and $\mathfrak{S}$ $\longrightarrow$ M:

or, expressed in hypothetical form:—

(*modus ponendo tollens*) S $\sim$ $\mathfrak{S}$: for if $\mathfrak{S}$ were indicated the absence of M would follow: but here (namely, in the case of S) the presence of M is indicated:

(*modus tollens*) S $\sim$ $\mathfrak{S}$: for if $\mathfrak{S}$ were indicated, the presence of M would follow: but here, the absence, etc.

And, lastly, take the case where the thesis is symbolized as S $\not\longrightarrow$ $\mathfrak{S}$,*—the case where (by means of a middle term) an exception is brought against some generalisation. It is somewhat difficult to frame any single formula for this mode of argument, while introducing any mention of a middle term. But the varieties may be reduced to *two* that appear fundamental, all minor kinds being capable of being shown to belong to one or the other.† These two are:—

* The symbol $\not\longrightarrow$ was explained on p. 68.

† For the reduction of these in detail, see Appendix (C).

(1) S $+\!\!\rightarrow \mathfrak{S}$: for S $+\!\!\rightarrow$ M, and $\mathfrak{S} \longrightarrow$ M (*Baroko*):
(2) S $+\!\!\rightarrow \mathfrak{S}$: for M $+\!\!\rightarrow \mathfrak{S}$, and M $\longrightarrow$ S (*Bokardo*).

The distinction made is briefly as follows: the first formula includes every case where, in support of a bare denial, some point of difference is shown to exist *in one or more instances* between S and $\mathfrak{S}$ of the positive assertion denied, or where S is shown to possess, in one or more instances, a sign (M, or non-M) of the absence of $\mathfrak{S}$. The second includes every case where an instance, or a part of the class spoken of, is brought forward as contradicting the generalisation. We may, for convenience call the former 'Exceptive disproof by Sign' or Difference,' and the latter 'Exceptive disproof by Example.' As instances, we may take for the former:—

"Quibbling is not necessarily a case of sophistry: for quibbling may be unintentional, while sophistry always implies the intention to deceive."

Or—

"Honesty is not always the best policy: for honesty sometimes means starvation (and what ends in starvation is certainly not, etc.)."

And for the latter—

"The radical is not always a man of lofty motives: your mere malcontent, for example, is often rather a selfish being, and every malcontent is of course a radical."

Or—

"It does not follow that a stickler for truth-telling need be narrow and severe: quakers, for example, make a great point of telling the exact and literal truth, and they are often charitable enough."

Three main kinds, then, of deductive argument are distinguishable:—

1. Proof by Sign:

2. Distinction by Point of Difference:

3. Exceptive Disproof:

And it has been noticed that these three apply respectively to the support of the three different kinds of thesis,—S $\longrightarrow \mathfrak{S}$, S $\sim \mathfrak{S}$, and S $+\!\!\rightarrow \mathfrak{S}$. It seems necessary, however, to remove a possible misconstruction here. It must not be supposed that *Barbara* and *Celarent* are themselves never used in Disproof, or *Cesare* and *Camestres* never used in Proof. On the contrary, both Disproof by sign, and Proof by essential difference are possible. Thus we might appeal to the sign that 'his hat is hanging on its peg,' in disproof of the assertion 'he has gone into the city;' or, on the other hand, we might prove, by means of a point of essential difference, the positive assertion that between whales and fishes a useful distinction may be made. But since on the whole the formula *Barbara* (or *Celarent*) is more often used to support a positive assertion, while the argument from Difference is more often used to support a bare denial of analogy or of superficial classification, it seems better, in treating the special arguments broadly and typically, to connect the former with Proof, the latter with Disproof. And as regards the assertion S $+\!\!\rightarrow \mathfrak{S}$, although from our point of view this may be treated as purely negative, yet it is undeniable that the vague and flimsy positive assertion which such propositions are on occasion used to express, may also be supported by the same evidence as that employed to support their meaning of bare but downright denial. This verbal difficulty need not, I

hope, after what has been already said about the interpretation of grammatical forms, occasion a real stumbling-block. And we may now, before speaking of the dangers of deduction as a whole, briefly discuss the occasions and purposes for which each of its three typical forms is most commonly employed.

(*a*) *Proof by Sign.*

In one sense, of course, all attempted Proof is an attempt to show signs. The Reason itself is always given as a supposed sign that the Thesis is true. But as contrasted with Empirical Proof, there need be no danger in restricting the name of 'Proof by Sign' to the cases where the sign given is plainly recognised as being such *in general*; where, that is, a middle term is in some way referred to, and where accordingly the attempted Proof approaches the deductive type. The distinction between empirical and deductive proof lies, as already said, in the fact that in the latter the proposition stating the universal trustworthiness of the sign asserted has already taken more definite shape in the mind of the person using the argument. Where, as in empirical proof, we argue that a theory is true because it is the 'best explanation' of certain facts, the proposition summing up the grounds on which this is taken to be the best explanation is nearly always too complicated to admit of statement without much preliminary labour, if at all. But so far as we refer to a sign, with definite consciousness that it

is (in general) a sign of the $\mathfrak{S}$, so far the argument is deductive.

The employment of Proof by Sign is one of the chief purposes, and clearly the directest purpose, for which every abstract proposition exists. In every abstract proposition, something is said universally to indicate (to be a *sign* of) $\mathfrak{S}$. And that 'something' becomes thereby capable of being made the middle term in Proof by Sign. If, therefore, any S can be identified with (or shown to indicate) such M, it indicates also, of necessity, that which the sign signifies; for *nota notæ est nota rei ipsius.*

In a former chapter * we saw that general names might be viewed as labels attached to the 'things' that bear them, and in Proof by Sign we have the clearest instance of the operation of the naming process. Whatever facts, positive and negative, are included in the meaning of a name, are true, of course, of anything which *rightfully* deserves the name. Hence, in order to prove one of such facts about a given S, we need only show its rightful possession of that particular label. While, then, this mode of Proof sometimes proceeds by stating both Principle and Application (full Demonstration), and sometimes by stating the Principle only, the commonest form is where the Reason states that S deserves (or, for the disjunctive argument, does not deserve) the name of M.

Proof by Sign is, in fact, so familiar and so fundamental a process that it seems hardly worth while to

* See p. 109, above.

spend more time in merely describing it. The dangers to which it is liable are our real concern, and these will be spoken of presently. But the other two modes of deductive argument call for a few words of further description.

(*b*) *Distinction by Point of Difference.*

The exact point of difference between S and $\frac{S}{s}$ is sometimes just as dimly conceived as is the resemblance relied upon in the Argument by Analogy. As the reader may have often noticed, the same class of minds that are satisfied with viewing S as 'exactly like' $\frac{S}{s}$, will also be satisfied on occasion (and equally through absence of discriminative power) to view them as 'totally distinct.' To discriminate is to see *points* of difference, not merely to deny at large all resemblance whatever. For some reason, however, the argument from 'indiscriminate difference' has obtained for itself no express recognition, though it certainly exists. Possibly this is to be explained by the greater pleasure which the view of resemblance gives, and thence the greater frequency of loose analogy. But since the danger here is essentially the same as the danger of Analogy,—namely the absence of exact discrimination,—there seems to be nothing further to say about it as a special kind of argument. The remedy is, to call for the supposed point of essential difference, and thus to raise the argument to the deductive rank.

Next, the expression 'essential difference' is one of those which have passed so freely into popular use as to be often employed without a clear apprehension of their meaning. Essential means again here, essential for some *purpose* understood. And the purpose of essential difference always is, to break down some supposed analogy, or to deny that S rightly deserves some name. Hence it is chiefly for Disproof that Distinction by point of difference is used.

It is clear, however, that any point of difference, essential or not, so long as it is thoroughgoing,—so long, that is, as S and $\mathfrak{S}$ *entirely* differ in regard to its possession, one (universally) having it and the other (universally) having it not,—is sufficient to support the thesis $S \sim \mathfrak{S}$. But S may differ from $\mathfrak{S}$ in many points, and yet a given analogy between them hold good. The whole force of this argument, when used in Disproof of analogy or sign, depends upon the question whether the point of difference (M) is essential for the purpose in hand.

Those who have not fully grasped the meaning and importance of the doctrine as to the burden of proof, may find at first sight a difficulty here. Is it incumbent on the *disputer* of an analogy to prove that the difference (M) is essential, or must the believer prove the essentiality of the resemblance relied upon? The simple answer is, that whichever asserts essentiality, whether of resemblance or of difference, must prove it or else be content to make an apparently unfounded assertion. It is, of course, possible that the disputer of an analogy

may commit himself so far as to say boldly that the analogy fails essentially; but this would be a highly gratuitous—often a rash—proceeding on his part. He may usefully make a milder assertion about it, namely that he sees a point of difference and is anxious to inquire whether the believer, having duly taken it into account, has reason to suppose it unessential. In that case, of course, he avoids all burden of proving anything but simple difference, leaving it to the other side to show wherein essentiality consists. If, however,—as it is sometimes safe to do,—he risks the full assertion that the given analogy does fail essentially, let us see what it becomes incumbent on him to prove. The analogical argument attacked is, say:—

$$S \longrightarrow Z: \text{ for } \mathfrak{S} \longrightarrow Z:$$

But, says the objector, "$\mathfrak{S} \longrightarrow$ M, while S $\longrightarrow$ non-M, *and M is essential.*" He asserts then that it is only because $\mathfrak{S} \longrightarrow$ M that $\mathfrak{S} \longrightarrow$ Z; that where M is absent the supposed indication of Z is worthless. This assertion, therefore, is implied in calling the difference essential, and must be proved, like any other assertion, before the case is made out.

From these considerations it follows that Distinction by *Essential* Difference can never be used except in Disproof, since the 'essential' always refers to something gone before. And it is also clear that Distinction by Simple Difference can rarely be used except with reference to some supposed mistake, since the positive assertion contained in saying merely that two things

differ is so safe as to be practically trivial. Everything differs from everything else in some points,—even a coin from its neighbour struck the next moment from the Mint,—just as everything also resembles in some point (even if it be only in being 'nameable') every other thing. The real value of a given assertion of difference is to contradict some supposed exaggeration of the importance due to a superficial or 'striking' likeness.

(c) *Exceptive Disproof.*

That the exception proves the rule, has passed into a popular saying. It is by seeing exceptions, and thus guarding our statements, that we establish any law on a firm basis, making it henceforward unexceptionable. By searching for exceptions we test, or try, the law set up for Proof. I am aware that this much-abused proverb is also sometimes interpreted to mean that since the given fact deserves to be called an exception it must be comparatively rare; but such an employment of the phrase (apart from its etymological shortcomings) borders so nearly on the *Petitio principii*—having no practical value except as a somewhat epigrammatic *argumentum ad hominem*, and being often in fact employed for a very different purpose—that it seems best to keep in view the other and more fruitful meaning. A supposed law which is found false in one instance becomes thereby fallible in all, until the exceptions are incorporated into its statement and thus its application narrowed. Henco

Disproof by exception is one of the most important processes of verifying, and so establishing or discarding, our theories. The 'best explanation,' or 'proved theory,' is that which remains over as a residue when all possible holes have been picked in the crude or sweeping assertion first put forward as a guess.

Exceptive Disproof is therefore the most frequent mode of attacking a generalisation directly: attacking, that is, the law itself asserted, not its grounds. To attack its grounds, as will be shown presently, the best way is either to point out essential difference between the cases observed and those inferred, or else to point out simple difference and inquire whether or no it is known, or why it is judged, to be unessential. But exceptive disproof finds at once the contradictory instance.

Amongst the misleading statements that float about so freely in common parlance is one to the effect that "Nothing is so hard as to prove a negative." The reverse is the actual case. Disproof, *qua* Disproof, is safer and easier than Proof, just as destruction is less troublesome than construction. In Disproof, since the Thesis is a bare denial, we commit ourselves to the least possible amount of dogmatic statement. We merely assert that some other given proposition is false, without venturing to say exactly what is true in place of it. The fact that underlies, and (with proper explanation) may be held to justify, the popular expression above quoted, is mainly the difficulty that attaches to such far-reaching words as 'never,' 'nowhere,' 'no

one,' and the like. 'Positive' assertions, whose corresponding negatives are obliged to employ these words, are, *through their vagueness*, so securely guarded against being brought to an actual test, that Disproof often becomes practically impossible. To prove, *e.g.* that my neighbour has never been in New York, or that no one has ever held a certain opinion, is of course to disprove the very vague assertion that these events *may* (at some time or other) have happened,—an assertion with which it is commonly safer, and perfectly harmless, to agree. Again, Disproof is sometimes *as* difficult as Proof—not more so. To disprove the existence of Buddha, or of table-rapping spirits, is manifestly impossible so long as there is no admitted test to which the question can be brought. But, as De Morgan has remarked, whenever we set out to *prove* (in the narrower sense) any Thesis, we must be prepared to *disprove* any one or more of an indefinite number of other assertions that conflict with it; while in order to disprove any Thesis we need only reduce it to absurdity; which is often possible without our being prepared to prove a single positive assertion about the matter. A definite theory, whether abstract or concrete, can be disproved by 'experience' more easily than it can be proved: for in disproof we have only to find some single instance which conflicts with the assertion if abstract, some single point in which it fails if concrete. It is in fact mainly by means of this simpler disproving operation that the securest experimental Proof takes place. All testing of

a Theory set up is, at bottom, nothing else than a search for contradicting facts existing or inferrible. On the thoroughness of the search the value of the test depends. After a long life of honourable security any theory may be in a moment upset, or at least may be found to need qualification, by the discovery of a single hidden circumstance: and experimental inquiry in its highest form is in reality an attempt to dispose beforehand of all relevant facts that can by any means be brought to light.

As regards the two varieties of this form of argument, (given on p. 242) not much requires to be said. The use of the one or the other clearly depends on the nature of our previous knowledge bearing on the question raised. Neither mode can, I think, be called altogether safer or better than the other, since even direct identification of M with S may well be mistaken. If, however, any preference is to be given, perhaps the latter (*Bokardo*) should have it. The dangers in the way of these, as of all forms of deductive argument, will be treated in a later section.

III. THE DANGERS OF THE ARGUMENT BY EXAMPLE.*

(*a*) *The Dangers of Analogy.*

In both kinds of Argument by Example,—Analogical reasoning and Inductive Proof—the primary danger is that of overlooking some hidden element in the *facts*, and thereby generalising too freely, rather than that

* The dangers peculiar to the special types of argument are shown, all together, in a table (V.) in the Appendix (E).

of accepting a definite principle which, true or not, does not apply. We are not here concerned with any dangers to argument when the principle relied upon is simple and clear, but solely with those incident to rapid unconscious employment of some highly complicated principle, or to our hurried summary of the total outcome of a conflict between unnumbered dimly formulated laws.

It was said above that in adopting Mill's formula for Analogy as typical, we must bear in mind that an actual argument, though truly analogical, may easily appear on the surface not quite to fit the formula. But this formula is nevertheless a perfectly legitimate simplification, since it serves to generalise the one danger to which all analogical arguments, in so far as analogical, are primarily liable: the danger, namely, that the resemblance between the cases supposed to be analogous is only a superficial one,—or, more widely still, that the resemblance, even if on the whole real and deep, is *not essential* for the purpose intended. So far as an argument professes to rest on analogy, the matter of first importance is to ascertain, if possible, the exact points of resemblance and difference between the cases compared, and to inquire further whether the resemblance as thus defined and limited has any right to be considered essential in regard to the purpose for which it is in the given case employed.

We saw also that the real difficulty in clearly placing the argument from Analogy among special kinds of Proof, arises from the fact that as soon as the exact points of resemblance relied upon come into clear view

the argument ceases to be analogical, and becomes deductive. That is to say, if we rest our belief that S ⟶ Z on the observed fact that $\mathfrak{S}$ (which resembles S *in the point M*) ⟶ Z, we are really beginning to employ, instead of mere analogy, the full syllogism 'S ⟶ Z, for S ⟶ M, and M * ⟶ Z.' Our clear recognition, that is, of the exact extent of resemblance relied upon, is itself a recognition of the underlying Principle by virtue of which S and $\mathfrak{S}$ are considered 'parallel cases;' in other words, is an assumption of a Law from which our thesis may be deduced. Take, for instance, the argument sometimes employed against Sunday closing, that since the upper classes have their clubs open on that day it would be unfair to deprive the poor of their only places of resort and refreshment. It is clear at once that we have here a case of complicated or double analogy, clubs being considered to 'essentially resemble' public-houses, and the upper classes to essentially resemble the lower. But what is meant by 'essential resemblance?' Not, surely, that the things compared are precisely alike in all respects,—else detection of false analogy would be a far simpler matter than at present: but that for the purposes immediately in view, the points of difference may be neglected. Now, as soon as we begin to neglect points of difference, no matter where, we begin to generalise: that is to say, we extend the possible range of our assertion. That which constitutes individuality is always the *difference* (*i.e.* peculiarity) that an individual possesses

* If not universally, at any rate equally when limited by S and $\mathfrak{S}$.

over and above any class to which he may belong, just as we have seen* that it is *differentia* that the sub-class or *species* possesses over and above the *genus*. So far, then, as we neglect the points of difference between clubs and public-houses, or between one class of men and another, we speak of them no longer as distinct individual things, but as members of some wider class which includes them and may possibly include other things as well. In the instance quoted, the key to the class intended is expressly given in the case of the analogy between clubs and public-houses: it is the being places of 'resort and refreshment' that is considered essential: this is the point of resemblance in virtue of which (*i.e.* to the extent of which) what is true of the one is supposed to be true of the other. As regards the analogy between upper and lower classes, it seems to have been thought unnecessary, or unsafe, to give the key expressly; such maxims as that "no class in the State should be specially favoured without reason shown" being widely accepted as a basis of legislation. And if this account of the analogy intended be a correct one,—if it is *only* as being places of resort and refreshment that public-houses are to be kept open for the benefit of the poor in their sole capacity of citizens of the State (or whatever may be the wide class to which upper and lower classes equally belong)—then we thereby imply the Generalisation, or Law, or Principle, "All citizens of the State are (*a priori*) equally entitled to their

* *Cf.* p. 108, above.

places of resort and refreshment;" by means of which, if true, the Thesis may be deductively proved.

However important, therefore, Analogy may be as setting us on the track of a fruitful Inference, as a mode of Proof it is in itself almost wholly worthless,—only sufficient, that is, to raise a vague and slight presumption where no better evidence can be obtained. It is perhaps more widely *applied*, in common discourse, even for Proof as well as for Inference, than any other form of argument. But this seems to be chiefly due to the slackness with which our examination of evidence is commonly carried on. It is so much less trouble to see that two things bear a 'striking resemblance' than to discriminate accurately how far the resemblance really goes, and the points wherein they differ. There is nothing, probably, that is more characteristic of the higher* intellect as contrasted with the lower than its greater power of discriminating,—*i.e.* of seeing points of difference. It is differentiation that is always the law of progress. Knowledge begins as a vague blur, which gradually becomes *distinct*. Everywhere the specialist's eye sees finer shades of difference than are visible to the public,—as the shepherd knows his sheep. It is incapacity for seeing difference that lies at the root of all crude, ill-considered generalisation, and therefore at the root of the mental 'narrowness' (as it is usually called) which is

* *Cf.* H. Spencer, *Psychology*, p. 220. "Incident forces that seem alike to a lowly endowed creature, seem conspicuously unlike to a creature endowed with the sense-organs required for appreciating them."

ever ready to accept a principle unduly simple and wide in its asserted sweep, and therefore unduly rigid in its actual application. It is neglect of difference that always marks the ruder nature, easily content with the roughest weights and measures. It is the besetting danger not only of ignorance as opposed to experience, of clumsiness as opposed to delicacy of touch, but also of the habit of dreamy theorising as opposed to patient reverence for fact.

In thus noticing the harm of neglecting difference, I must not be understood, of course, to advocate the neglect of real resemblance; only to say that this is a fault to which the majority are in practice far less liable. The inducements to over-generalise are on the whole stronger than those to indulge in excessive hair-splitting. And apart from mere ignorance or incapacity, it is always less trouble to avoid distinguishing, even when we have attained the power: the recognition of resemblance, whether justified or not, is always a more pleasant operation, simplifying Nature and thereby giving freedom, and also much self-satisfaction, to the mind that sees the supposed analogy. Hence, no doubt, much of the charm of metaphor and of the cruder kinds of poetry, and hence the efficacy, in spite of its unfairness, of caricature. Whatever appeals to our idleness, while at the same time gently flattering our sense of 'breadth of view,' always bids fair to win a wide reception. In its effects, hair-splitting is perhaps a more deadly fault than coarseness of vision, though less the property of the uninstructed, the

thoughtless, the impatient, and the clumsy. The power of seeing differences, exclusively cultivated, leads no doubt to a casuistry and a hesitation which are far from being either pleasant or practical. So, too, the mere neglect of resemblance, without at the same time a distinct and conscious vision of differences, cripples our power of extended sight and of useful generalisation. This forms indeed no *fallacy*, as the term is generally understood; but it is a serious limitation, as the existence and spread of general names, and of science itself, bears standing witness. Often, no doubt, it is merely the recoil from hasty generalisation that leads to the adoption of 'rule of thumb:' in any case, however, this is of course a falling short from the ideal.

It is the undue neglect of difference, then, in the midst of recognised resemblance, that constitutes the fallacy of False Analogy, just as the due neglect of difference constitutes sound generalisation. While the ideal is, to give to both Resemblance and Difference their due weight, the actual course of the history of knowledge, so far back as it can be traced, is a record mainly of unsuspected differences brought to light. Where any sound generalisation has been reached, it has in most cases either been preceded by deep analysis, or is itself the residue of an unsound generalisation after it has gone through a process of limitation and restriction in order to make it fit the facts. Further back than any records go, Philology helps us to see that the earliest traceable formation of language has proceeded also by analysis of what first

seemed simple. First we find one word employed for what we now know to be many different things: gradually, as insight deepens, new words grow up, in order to mark off groups and portions as distinct. While there may be a synthesis based upon analysis, the first step is to analyse what before seemed simple.

The shapes in which False Analogy usually occurs are very numerous. They range from open reliance on Analogy in lieu of Proof, down to the finest shades of rhetorical suggestion by means of metaphor; and even into the region where metaphor ceases to be distinguishable as such, and where we reach the unavoidable shortcomings of language. Taking first the more definite end of the scale, the following example will show to some extent the dangers of analogy. An eminent author, writing on the work of the English Church before the Tractarian movement, contrasts the newer state of things unfavourably with the older, because the Church in those former days

"taught us to use religion as a light by which to see our way along the road of duty. Without the Sun our eyes would be of no use to us; but if we look *at* the Sun we are simply dazzled and can see neither it nor anything else. It is precisely the same with theological speculations. If the beacon lamp is shining a man of healthy mind will not discuss the composition of the flame."

Here, of course, the resemblance between the Protestant religion and a light to lighten the road of duty is sufficiently striking, and (if it be granted, as for the purpose of this argument it may safely be,

that the light is no mere will-of-the-wisp) no fault need be found with the metaphor so far. But in what respects do 'theological speculations' really resemble the process of 'looking *at* the light'? Whatever other faults the movement spoken of may have had, surely it was, in essentials, an attempt to look more closely *at the road of duty as illumined by the light.* To call this looking *at* the light is merely a loose and convenient elliptical expression. At any rate, nothing is openly said by the writer to show that this latter employment of the metaphor is not a better one, and if we are to suppose such a denial covertly made, it comes very near to begging the most important question concerned. But in order to show more strikingly the worthless character of analogy as argument, it may be further noticed that in the second half of the sentence the metaphor is changed, by its author himself, in a way that saves an opponent all trouble, inasmuch as it forces the first analogy to defeat its own purpose. Religion becomes no longer a Sun for lighting up the road, but a 'beacon lamp,'—a thing whose use and purpose is precisely to be looked *at:* and in order to save the argument, theological speculation has now to be likened to 'discussing the composition of the flame.' Would not the Tractarians say rather that if they cared to discuss the composition of the flame at all, it was only so far as might enable them to be sure that this really was the 'beacon lamp' of which they were in search? Analogy used in this way is, no doubt, as things are, a powerful

rhetorical instrument; but it is not one that is destined to extend its influence in the future. The remedy is so easy. Give a dealer in analogy rope enough and he will probably end as above; but if not, and if it be considered too much trouble, or too difficult, or too slow, to inquire exactly into the real points of resemblance and difference, nothing is simpler than to change the metaphor and so turn the tables. One arguer can always assert covertly as well as another, and it requires no great intellectual strain to produce a happy simile or to fix the attention of a busy or thoughtless audience on some 'striking likeness' which is so neat and pretty that it seems to them it cannot be untrue. It is, however, solely when a supposed analogy is put (or accepted) in place of argument that harm is done. As mere illustration, or as re-assertion of a thesis in a more concrete form, only pedantry can object to it; and as supplying the first vague hints for future verification it will always be the chief stepping-stone to good results. But the line between employing Analogy as argument and employing it with an open recognition of its dangers is so exceedingly fine that it becomes in practice almost impossible to over-estimate the need of keeping a jealous guard against neglected points of difference. It must also be remarked, that even where the analogy is plainly a false one, it is always possible that the person employing it has himself been under no delusion as to the gap requiring to be filled up, but has only overrated the discriminative power of his audience, —or forgotten their readiness to be deceived.

Open reliance on Analogy as argument is rare. The analogical arguments that we find actually employed show a decided disinclination to express themselves in a quite straightforward fashion; unless, indeed, as in some of the cases above quoted, the connecting link (or middle term) is fairly obvious, and the argument, therefore, already nearly deductive and easily raised to that higher rank. As a general rule, the more merely analogical (*i.e.* the less deductive) the argument is, the more will it naturally tend to avoid open and definite expression by means of this simplest formula: for the definite expression of reliance upon the resemblance between S and S' to prove a definite assertion regarding S, is apt to pave the way for inquiries that are then felt to be awkward. When the Analogy is a weak one (and equally when the points of resemblance are numerous or not easily summed up) nothing of course is more damping to the argument than any call for a clear statement of the exact points of resemblance relied upon; and hence in many cases even the setting S and S' clearly side by side, and reducing the reasoning to the above formula, becomes almost tantamount to a reduction of the whole argument to absurdity; and is constantly employed for that purpose. Thus when a speaker in Parliament declared that—

"To say that there was nothing in the nature of a compact or agreement between the Government and the gentlemen whom they had been keeping in confinement without trial, reminded him of the principal character in one of Molière's comedies, who said that he had not sold anything, but had merely given it away to his friends and they had given him some money in exchange—"

we find the other side making answer that—

"So far as the speech of the hon. member was not a mere baseless dream . . . it contains at least this one statement, that *because* in Molière there was a man who, having sold goods and received a price, pretended that he had made a present of the goods and received a present in return, the position of the Government is analogous to that man."

And then comes a statement of the "essential difference" between the two apparently parallel cases.

As a general rule, then, Analogy has a tendency in practice to put itself forward either as merely intended to raise a vague presumption, or else (and more commonly), with an air of coming *ex abundanti*, rather than as being in fact the sole evidence relied upon. It is usually given, however unintentionally, in such a manner that, if objections should be raised, it remains easy to claim that only an illustration was intended, and to grant with much candour that possibly as an illustration it fails to fit the case exactly; a process which closely resembles the parliamentary practice of first using and then 'withdrawing' an offensive expression. The express words 'because,' or 'for,' or 'since,' are as a rule omitted by the speaker: the connexion will be amply supplied, as every experienced rhetorician must know, by any average audience, and being thus voluntarily supplied by the audience, will probably be less exposed to their criticism. Whately, for example, did not write, "Inductive Logic can never be a rival to the Aristotelian Logic, *since* a plough can never be substituted for a flail," but he wrote that Inductive Logic—

"Would not . . . have the same object proposed with the Aristotelian Logic; nor be in any respect a rival to that system. A plough may be a much more ingenious and valuable instrument than a flail, but it can never be substituted for it." *

Or again, Sir S. Northcote (speaking at Balham), did not say "Mr. Gladstone, *because* he is fond of hewing down trees, will be likely to want to hew down our institutions," but he said—

"We shall be abused by a great number of people because we hesitate to give to the Prime Minister exactly the facilities he demands, but we shall endeavour to do our duty when those demands are made upon us; and we may take to heart one of those wise fables on which our youth was nourished. You may remember how a certain woodman went into the forest and asked the trees to lend him a bit of wood in order that he might make a handle to his axe. When they were unwise enough to give him a piece of wood, you recollect what happened to the trees themselves by the use the woodman made of the axe (cheers and laughter)." *

These examples will be sufficient to show what is here intended. But the difficulty of deciding whether the Analogy was really relied upon as evidence, or genuinely and legitimately put forward as an illustration merely, or to point a quaint and semi-serious fancy, is not the only one to which we are exposed in practice, nor the most perplexing. This can, indeed, to a great extent be met (much as an unparliamentary expression may be met) by demanding a disclaimer on the spot. A far more difficult question arises when we attempt to fix the line between the metaphorical [and the direct use of *names*

* The reader will notice that these cases are not given as examples of *false* analogy, but merely of the usual method of getting an analogy (true or false) accepted by an audience.

And perhaps the most frequent manner in which covert analogy is used as argument, is by condensation into a name which just escapes being considered far-fetched or metaphorical.

"It was observed by a sound thinker in those parts, that property was ballast, and when once the aptness of that metaphor had been perceived, it followed that a man was not fit to navigate the sea of politics without a great deal of such ballast."

That which to George Eliot and to most of her readers was clearly a mere metaphor, the aptness of which was all-important to the force of the argument, passed easily, she tells us, among the less educated electors of Treby Magna, as hardly distinguishable from a plain statement of fact. The power of recognising metaphor as metaphor is one of the latest and highest acquisitions (so far as it is yet acquired) of mankind; an outgrowth of the accurate spirit which marks off modern science from the ancient reign of florid imagination.

To some extent, however, we are all in the position of these electors. We smile at their simplicity, but future generations will smile at ours in turn. The schoolboy of the twentieth century may find a difficulty in realising that his ancestors were misled into supposing fleshiness of body to be "padding against the shafts of disease," or a glass of sherry taken just after a large and varied dinner, to be, in the sense intended, a "whitewash." At present the words are few where metaphor is wholly absent, and under metaphor wherever employed some danger lurks. Who is to guarantee, for example, that

the expression that danger "lurks" in metaphor will not at all mislead us? We are always rather prone to personify abstractions, and so far as we really picture Fallacy as external to ourselves, we are neglecting one of the most important facts about it.

Proverbs again are frequently employed in arguing by indistinct resemblance. It is the slackness with which any 'striking' analogy will commonly pass muster that leads at all times to the use so freely made of proverbs. To assume that some case comes under some well-known proverb, without a shadow of evidence to show that it does so beyond what may be gathered from the crudest superficial inspection, is still in many quarters a favourite practice. Hence, as a rule, the earliest recorded crystallisation of wisdom has usually been a collection of proverbs or of fables or allegories,—which latter are only a less generalised form of the same expedient,—and to some extent the process appears to be still going on. It is true that in these times such oracular wisdom obtains less influence than in the days of Solomon or even of Bacon, but one must admit that there is still some chance for a writer to win in this way a certain popular reputation for prophetic insight. On all such easy dogmatism the action of Logic is apt to be purely repressive.

We see then, in short, that analogical reasoning may be defined as the dim and unsupported assertion of essential resemblance. To assert essential resemblance is in itself a large undertaking, and yet there are few

assertions which are commonly made with a lighter heart or believed more obstinately. Only before the resemblance between S and $\mathfrak{S}$ is clearly defined and limited, can an argument be properly called analogical: and meeting with an argument which is at present in the merely analogical stage, the first step towards its examination is the attempt to clearly define and limit the extent of the resemblance and difference supposed to exist: which attempt, so far as successful, destroys the merely analogical character of the argument, by bringing into daylight the supposed underlying Principle. The special danger of any argument, so far as it relies upon Analogy, is the possible existence of unsuspected and essential difference between the things compared. This is the vital point of every analogical argument, the point to which attack should be directed, and which, if we are defending the analogy, it behoves us most to be prepared to guard. Until this doubt is set at rest, there is nothing to show that the resemblance, how striking soever, is more than surface-deep, or, even if really far-reaching, that it has any bearing upon the special point at issue.

(*b*) *The Dangers of Induction.*

Before beginning to discuss the dangers of the inductive mode of argument, it may be worth while to recall attention to the various shades of assertion comprised under the extremely general formula $S \longrightarrow \mathfrak{S}$. In the first place, it must be remembered (as noticed at pp. 78–83)

that at the present stage of knowledge the propositions where such a statement can be in practice interpreted quite unreservedly are comparatively few in number. Here and there, certainly, we have discovered generalisations which seem absolutely true, so far at least as our tests can yet try them and so far as all present practical purposes are concerned,—such as the Law of Causation itself, or the law that human beings have human ancestors, or that all matter gravitates, or that decapitation causes death. But for the most part, even in Science, we are forced to be content with laws which express *tendencies* * merely. Often, indeed, we think ourselves fortunate if we can reach any shadow of a law at all. It is no exaggeration to say that the greater part of the knowledge on which daily conduct depends for its rationalisation consists solely of generalisations which, however crudely and boldly *expressed* and at intervals believed, are really apprehended (so far as regards persistent or fruitful apprehension) in the dimmest and vaguest way. To go no further than the popular maxim in favour of speaking the truth, every thoughtful person will admit nowadays that the law as usually stated needs *some* qualification; although most people feel the admission dangerous, since no one has yet been able to formulate the real law so as, while avoiding mere platitude, to take in all the exceptions.

* The law of Gravity, it should be noticed, merely avoids this difficulty in a verbal manner. It is absolutely true that all matter gravitates: but 'gravitates' is a word coined to express the meaning 'tends to fall.'

Next, S (in general) may be asserted to indicate $\mathfrak{S}$ (whether absolutely or reservedly) either as its cause, its concomitant, or its effect,—that is, either as having existed, as existing, or as to exist in the future. To assert that $\mathfrak{S}$ is * the *sole cause* of S is to assert absolutely that S wherever found indicates $\mathfrak{S}$'s past existence (*e.g.* 'Life is always due to prior life'): to assert the same indication 'reservedly' is to assert either that $\mathfrak{S}$ is one cause but that there may be others; or, in the most reserved form of all, that an observed sequence $\mathfrak{S}$ followed by S was 'not purely accidental.' † To assert absolutely that S wherever found indicates $\mathfrak{S}$'s present existence, is to assert that every S without exception possesses the attribute, belongs to the class, deserves the name, or is found in conjunction with, $\mathfrak{S}$: to assert the same reservedly is to assert that S and $\mathfrak{S}$ are more or less often found together (or that S is nearly always, usually, frequently, $\mathfrak{S}$)—more often than mere coincidence will account for,—or again that the observed conjunction S and $\mathfrak{S}$ in co-existence will at least tend to recur. To assert absolutely that S wherever found indicates $\mathfrak{S}$'s future existence is to assert not only that S is a cause (or the cause) of $\mathfrak{S}$, but that no other cause is ever capable of interfering with it,—a very large assertion: to assert the same reservedly is to assert that S, unless something unspecified interferes, may serve as a sign that

* To say that $\mathfrak{S}$ *was* the sole cause generally bears a quite different meaning, namely that some other thing (perhaps vaguely specified) was *not* operative.

† See note at p. 81.

$\mathfrak{S}$ will happen, or that the observed sequence S followed by $\mathfrak{S}$ will tend to recur.

In spite of these tangled variations there is, as it seems to me, a sufficient reason for framing the formula as above. This is the ideal type, by comparison with which any actual shortcomings may best be made apparent. If S does not indicate $\mathfrak{S}$ quite absolutely, there is no better means of seeing why and how far it falls short of doing so, than an inquiry what are the dangers to which such certainty is exposed and what has been done to guard against them. And as for the time-element, that may be neglected, so far as a first outlined view of the dangers is concerned. Just as the process may be generalised, so may the dangers. In spite of their surface variations their deepest meaning is the same. There is at bottom one primary source of fallacy in the inductive argument, call it by whatever name may be most convenient. We may name it, for instance, the danger of "overlooking Plurality of Causes, or neglecting possible Chance or Counteraction," or "the possibility of unknown antecedents," or "arguing either *post hoc ergo propter hoc* or *per enumerationem simplicem*," or "neglecting to exclude alternative possibilities," or "forgetting that facts may bear more than one interpretation," or "stating the law too widely," or "failing to see below the surface," or—perhaps on the whole best of all—"unduly neglecting points of difference."

It may be well here to make a slight digression in order to show more definitely how 'undue neglect of dif-

ference' is the main danger of direct generalisation just as of the argument from analogy. Concrete evidence for an abstract law consists, it has been said, of a case or cases brought forward, of which such law is asserted to be the best explanation. If then some better explanation is possible the theory as stated is impeachable. But what is meant by a better explanation? Can there be degrees of explanation, so long as the facts are all explained? Surely the facts relied upon either do or do not all form cases under the law asserted? Surely the term 'better' or 'worse' is inappropriate? By the best explanation is meant, however, not only any law from which all the facts observed are deducible,—for we may often frame many different hypotheses, inconsistent with each other, which will each explain all the facts; but what is meant is, that solitary one out of all possible hypotheses which, while explaining all the facts already in view, is narrowed, limited, hedged, or qualified, sufficiently to guard in the best possible way against *undiscovered exceptions* also. The wider the law the greater the danger, until precautions are taken: and it is in the strength of these precautions that the value of any Theory lies. It is a merely negative condition, or absolute *sine quâ non*, that a Theory shall at least explain the facts already in view: failing this, it is condemned, or seen to need qualification, on the threshold. But beyond and above the preliminary condition that no known fact as yet contradicts the theory, we need also the assurance, in some shape or other, that *if there were* exceptions (or con-

tradictory instances) their existence would already have been discovered or inferrible. This assurance it is which forms the turning-point of inductive proof. Hence the 'best' explanation of the facts A and B and C is that explanation which while neglecting certain points of difference among them, and thus forming some generalisation, neglects only those differences which are 'unessential:' the best explanation of (*i.e.* generalisation from) one solitary sequence observed is that which neglects only its unessential elements or features. While all generalisation exists by neglecting points of difference, the soundness of any generalisation consists entirely in the completeness with which it balances out the relative importance of the points of difference concerned. The assumption at the bottom of all our explanation and prediction—of all our reduction of Nature to Law—is not only that the same antecedents will have the same consequents (for it seems hardly necessary to say that no two total sets of circumstances ever were or will be precisely alike *), but that whenever *some* of the observed circumstances recur, *some* of the same antecedents, concomitants and consequents may be looked for. The problem is always to discover exactly which of the component circumstances of one total event are essential to any given portion selected from those of another. Every abstract proposition selects some only as being essential,

* Just as the members of every class of objects have their points of dissimilarity from each other, as well as the points of similarity which constitute them a class, so have the members of any class of events.

and it is through deep analysis of the actual circumstances that we avoid selecting too few. The two opposite modes of missing the ideal, then, are:—(1) to be content with too little repetition of circumstances—too broad a law,—as when we say in our haste "All men are liars," and (2) to demand too exact a repetition of circumstances —too narrow a law,—as in the case of the Chinaman who burnt down his house in order to repeat as far as possible the exact circumstances in which he first obtained a certain kind of cookery. The former fault is the inductive *fallacy* proper: the latter may be a serious hindrance to knowledge, or may lead to a waste of time or money or trouble, but it makes no false pretence and thus runs less risk of failure in obtaining the immediate effect required.

It is in every case, then, through undue neglect of the essential difference between the specific case or cases observed and the wider genus to which the assertion professes to refer, that we rise to a generalisation not sufficiently guarded against possible exceptions. The ideal is, to frame every generalisation unexceptionably,—so that no exception can be found,—and this whether the outward form that the statement takes is simple—as in "All matter gravitates,"—or qualified, as in "All stones fall to the ground *except* when restrained in certain ways from doing so." It is either by far-reaching foresight or by growing experience that exceptions come to light; and when they are recognised, the supposed law has either to be abandoned altogether (if

they are numerous and important) or modified in order to take them in. The experimental methods are thus, in one aspect, methods for as far as possible anticipating the discovery of exceptions.

The first and weakest remedy against stating as a law at all, what should properly be called a coincidence, is the employment of the Theory of Probabilities: an immense subject, and full of dangers of its own. Any full discussion of its details is here out of the question;* nor, indeed, is it required for our purposes. It may, however, be explained that, as regards Proof and Disproof—*i.e.* as regards the simple answer Yes or No, to a question raised and debated,—the chief operation of the doctrine is in enabling us to say in certain cases that S and $\mathfrak{S}$ (*e.g.* sun-spots and magnetic storms) occur in conjunction more frequently than can be accounted for by mere coincidence. In the absence of any knowledge of the causation concerned, such a result may, no doubt, have a certain value. But in pursuance of our plan, we shall confine attention to the more marked and definite end of the scale. The employment of the Doctrine of Chances must always be superseded by more stringent methods as soon as inquiry passes beyond its very earliest and most tentative stages.

Since, then, for complete proof of a law from facts two things are necessary:—

* Mr. Venn's *Logic of Chance* is generally considered the best English work on the subject. See also Mill's *Logic*, bk. iii. chaps. xvii. xviii. and xxiii.; and Bain's *Induction*, chap. ix.

(1) The assurance that no contradictory instance has yet been found, and

(2) The assurance that if a contradictory instance existed its existence would be known:

it follows that *negatively* all turns on the finding of contradictory instances, while *positively* all turns on the completeness of the search for them. All positive proof depends not on the fact of observations having been made nor even on the fact of experiments having been performed; but on the care, the precautions, with which observation has been interpreted and experiment conducted.* So far only as these exclude alternative possibilities, are they of real value.

We have noticed, more than once, the danger of overlooking alternative possibilities. And it is true that every Theory set up has, in the first place, to show its preferability over all conflicting theories. This is precisely what is meant by saying that the burden of proof remains. Just because Disproof is easier than Proof,* and because all positive assertion can only justify itself as a remainder when negative assertions are subtracted—when mistakes have been either one by one eliminated or in a body prevented—the burden of doubt to be removed by evidence consists essentially in the group of alternative theories remaining undiscarded. The important point is always, to show that all other possible theories are weighed in the balance and found wanting: that is to say, that all precautions have been taken against

* See p. 250.

that crudest kind of unchecked generalisation which the least trained mind possesses ever in greatest abundance.

This objection against a theory—that alternative theories are not yet discarded—appears, however, more directly applicable, more fruitful of results, against a concrete or an abstract-concrete thesis than against a directly abstract one; and as a method of attack on such theses, where for any reason it may be inconvenient to search for the supposed underlying Principles, it could no doubt be made useful. Accordingly I have thought it worth while to set out in an Appendix (A) a summary of the alternative theories amongst which any observed concrete sequence or coexistence has to choose. Every observation or experiment *interpreted* is a case of the assertion of an abstract-concrete proposition. Finding S followed or accompanied by $\mathfrak{S}$, under certain conditions, we assert causal connection between them. And the right of the theory chosen, over all its possible rivals, depends entirely upon the depth of our insight into the conditions under which the experiment or observation was really made. This is the main lesson of Logic, as regards Induction. The illogical person is content to produce, as evidence for a supposed instance of causation, the bare fact of succession in time, or unexplained concomitance,—as, for example, in the case of quack remedies, or again, in nearly all cases of superstitious belief; while inductive science always demands as full an analysis as possible, of all the circumstances. Failing this, as with all care it must sometimes fail, the proof is recognised as weak.

(c) *The Empirical Methods.*

Of Empirical Methods the only careful classification yet made is, I believe, Mill's well-known list of five. While, as their author himself (and more lately, Professor Jevons) expended labour in showing, none of these is, except in an ideal sense, completely satisfactory as a guarantee, but in every case a further assertion is practically wanted; yet the statement of the method employed in the given experiment or observation, together with the precautions taken against its special dangers, may be regarded as the answer given to the challenge of possible alternatives: in other words, as a means of shifting the burden of proof.

Since there may possibly be, in some quarters, a disposition to take these methods for more than they were probably intended to be worth, there will perhaps be some use in reminding the reader that it is the guarding against the danger to which each method is liable, that is in every case the all-important circumstance—far more so than the mere employment of this or the other method. It is not, for instance, because a given experiment "proceeds according to the Method of Difference" that the evidence is strong, but because by means of certain precautions (often more easily taken under the Method of Difference than in the other cases) we happen to have approximately reached the *ideal* there set up. A careful employment of the "weakest" of the methods is often better than a loose employment of the strongest.

It seems unnecessary in this place to obscure our more general view by entering upon the Empirical Methods in detail and discussing their special liabilities to frustration.* It will be enough here to remark that ultimately the sole danger of fallacy in empirical proof is that of neglecting to take into account the differences between the Antecedent (or Consequent) observed in any actual sequence,† and that spoken of in the S (or $\breve{S}$) of our abstract proposition based upon it. In any sequence observed in Nature there are usually certain elements overlooked at first, and if one of these be important, our 'natural' inference is to that extent misguided. Thus for a long time the possibility was overlooked that the phenomena of fermentation could be due to germs floating in the air. From the most careful experiments that were made up to the beginning of the present century, the belief was held that since all the possible external sources were known and guarded against, the generation of the yeast-plant *must* take place in some 'spontaneous' fashion within the fluid itself. So again, until quite recently it was commonly believed that the carbon of vegetable produce must come from the soil: that it should be almost entirely derived from colourless air, seemed on the face of it unlikely.

The same danger may be otherwise phrased by say-

* I have, however, thought it well to set these out in the Appendix (B).

† For brevity I here speak of sequence only; since unless causation be a dream, co-existence may always be reduced to a complex result of sequences. See also Appendix (A).

ing that the empirical fallacy consists in resting our proof of a law or theory on confirmatory (*i.e.* congruent) facts *alone*. If the facts around us do not fit our theories we have of course unanswerable disproof: but if the facts do fit them, the theories are not yet necessarily secure. We need besides such facts, in every case the further assurance that any contradictory facts, if existing, would have come to light. And so far as this assurance is wanting, so far the proof is weak. Mere number of confirmatory facts will sometimes yield us this assurance, but only so far as in the given case the special circumstances guarantee this, is number of any avail. In many cases (*e.g.* in most chemical experiments) a single instance is more trustworthy than a thousand of another kind, since here the precautions are often enough to exclude 'unknown antecedents.' The assurance lies outside any inductive methods: for the various methods merely correspond to various forms which the same difficulty takes on. It is analysis only that can enable us to know how far we have really reckoned with unknown antecedents, —analysis of the complex facts presented to our observation. The whole difference between sound and unsound generalisation lies in the care with which we seek for hidden elements in the cases observed, which shall modify our first rough guess at the law supposed to explain them.

Accordingly the attack on a generalisation most usefully takes the shape of an attempt either directly to point out hidden circumstances in the facts observed,

or at the least to point out that the analysis has not been a remarkably searching one. Thus Prof. Tyndall, attacking the theory that *Bacteria* are capable of 'spontaneous generation,' sums up the chief faults of the argument as follows :—

"The proof of Bacterial death at 140° Fahr. consists solely in the observed fact, that when *a certain liquid* is heated to that temperature no life appears in it afterwards; while *in another liquid* life appears two days after it has been heated to 212°. Instead of concluding that in the one liquid life is destroyed and in the other not, it is assumed that 140° Fahr. is the death-temperature for both; and this being so, the life observed in the second liquid is regarded as a case of spontaneous generation. A great deal of Dr. Bastian's most cogent reasoning rests upon this foundation. Assumptions of this kind guide him in his most serious experiments. He finds, for example, that a mineral solution does not develop *Bacteria* when exposed to the air; and he concludes from this that an organic infusion also may be thus exposed without danger of infection. He exposes turnip-juice accordingly, obtains a crop of *Bacteria*, which, in the light of his assumption, are spontaneously generated. Such are the warp and woof of some of the weightiest arguments on this question which have been addressed by him to the Royal Society."

Finding M (a component of S) followed or accompanied by Z, whether in numerous instances, or in one instance where apparently no third circumstance has had time or opportunity to intervene, the natural impulse is to state the law as M $\longrightarrow$ Z. And, in every case, attack on the truth of such law consists ultimately either in the direct assertion that certain instances do in fact contradict it, or in the milder assertion that no steps have been taken to limit the sweep of the law as far as prudence would suggest; or in the still milder shape

of an inquiry whether or no such steps have been taken. If, in the case observed, M or Z was really qualified by the presence of N, it is always possible that the real law may be N ⟶ Z, or MN ⟶ Z, or M ⟶ ZN, or MN ⟶ ZN; that is, N may be an important factor, and any statement of the law which neglects to mention it may accordingly be inexact and misleading.

In the Appendix it is noticed that the five methods consist really of variations upon two that are fundamental. These two are the Methods of Agreement and of Difference. It is questionable, however, whether the distinction even between these two is of real importance from our point of view. As regards observed coexistences, the Method of Difference is plainly altogether inapplicable until they are resolved into sequences (which is often at present *practically* impossible); but as regards sequences the distinction depends merely on the fact that in employing the Method of Agreement 'unknown circumstances' are eliminated chiefly by the *number* and *variety* of observations, while in employing the Method of Difference it is chiefly the *immediacy* of the sequence (known through our control of surrounding conditions) that is relied upon for the same purpose. But in both we may be deluded, and by the same cause. The case or cases upon which we rest our theory may really belong to a narrower class than that which the theory contemplates. Their *differentia* over the *genus* about which we make the assertion, may be an important factor in the behaviour of the things observed.

The Five Inductive Methods, with all their unlikeness to each other, have thus one important point of similarity. They all consist in bringing cases,—claimed to be unmistakable on account either of their 'nature' and circumstances, or their number and variety,—cases of the operation of the law set up as Thesis, and of no more complex one. And consequently the one point of vulnerability for all of them is the possibility that the cases relied upon were somehow different from those expressly covered by the law; that, in fact, there were special circumstances along with them, which should be generalised so as to find expression in the statement of the law, making it narrower than at present.

The five methods are not in themselves a set of separate safeguards against inductive fallacy, or a complete exposition of the modes in which we *ought* to reason from fact to law; but rather a generalised analysis of some of the most elementary modes in which we *do* (or perhaps, did originally) so reason; each of these modes being liable to its own special dangers, and therefore, unless properly guarded, each and all being illusory as a guarantee. Regarded simply as methods of Proof, they are in several ways not quite satisfactory. They are in this dilemma: either they are to be used as actual tests, to which we can bring the given experiment,—in which case they are certainly liable to 'frustration;' or else they are merely ideals to which in practice we can never be sure that we attain. Moreover, they assume a greater simplicity of material than really ever exists, and

they assume too that the mind comes to its work of interpreting the facts of experience in a state of candour and virgin ignorance which is—ever since language took shape—very far from being the actual case. Their practical value, therefore, is rather as systematic hints for tentative discovery, than as methods of Proof at all.

How then is our general knowledge proved from the particular facts of experience? It can be disproved by experience easily (subject of course to the familiar possibility of our supposed experience being itself illusory), but proof of an abstract proposition can never be theoretically complete, and the lines which we draw across the long scale between the highest practical certainty and the wildest guess-work are, like all our distinctions in continuous nature, useful up to a certain point but incapable of standing close scrutiny or careful refinement. The truth that destruction is easy and construction difficult, is nowhere better exemplified than in our proof of general laws. A sequence in Nature is observed to happen frequently; this perhaps sets some ingenious inquirer on the track of a law; experiments (we are speaking, of course, of modern times), are made with the view of testing the hypothesis,—of narrowing down the law into definiteness and limiting it as far as necessary. At last, after many struggles it comes forth as a recognised empirical law. But now it either remains in this condition, with the sword of possible contradictory instances ever hanging over its head, or by some further discovery it gets established under the protection of

some wider law with a greater prescriptive right. *Now*, if it be false, this wider law must be false also. Perhaps it is secure at last? Perhaps it may be; practically it often is, but theoretically never. For every supposed law has merely served its purpose and stood its tests (such tests as we can apply) for a certain finite length of time. After centuries of life it may be upset in a moment, or at least found to be not universally true, to be true only under conditions, to be crude in its present statement and to need further refining away. The longer it has stood its trial, the safer of course it is against the fear of contradictory instances coming to light; in fact, it has probably been pared down already to accommodate such instances a dozen times, being of course narrowed each time.

It is an ungrateful task for any one who cares about the distinction between truth and error, to dwell on such facts as these, without some further apology. They seem at first sight to prove too much,—namely that there is no certainty ever attainable in interpreting Nature, but that 'unknown antecedents' are as ubiquitous, and possibly as destructive to our best theories, as the dangers to health in the midst of which our lives are passed. Nor do I, in fact, see any way of denying this except by means of deliberate self-deception. But such apology as I can make for this view will come better in speaking, at the end, of some of the defences that can be made for Logic as a practical science.

Of course, in the case of a great many laws believed

in, the question is settled for us by ancestral habits; and in many other cases we shall accomplish more in the world by faith than by scepticism. But here we are merely trying, for the moment, to see the facts as they are, and not as practical prudence might suggest that we had better habitually view them. And two things, I think, we cannot help admitting:—

First, that every supposed law, whether of succession or coexistence, may turn out to be too widely stated. If, as is probable, there is 'some truth in' such law, yet the assertion it makes may be too wide and sweeping, and perhaps ought to be limited in some way, making it true only under certain conditions.

Secondly, between mere guesses, hypotheses, theories, empirical laws, and 'laws of Nature,' there are only continuous differences of degree in certainty, according to the nature and number of the tests they have stood, and the duration of their past invulnerability. In the case of Axioms, so far as their contradictory is inconceivable—*i.e.* makes nonsense of the words employed,—so far of course it is futile to speak of their uncertainty; but wherever this is not the case, Axioms too come merely at the head of this same scale of credibility. The resemblance in uncertainty between a fanciful guess and a proved law may be less important than the difference in degree of certainty: but the fact cannot be safely hidden that the resemblance exists.

The distinction often made between valid inductions and 'merely empirical laws' is then, strictly speaking,

not absolute, though roughly useful; the line between them will not bear close inspection. For 'empirical' means 'true so far as we can yet see, but, inasmuch as inexplicable at present by a higher law, possibly liable to further limitation;' and this may be said of every Law of Nature we possess.' The method of proving laws is one and the same whether they be the merest wildest supposition or the soundest explanation of the facts of Nature. In the first place it is a *sine quâ non* that no contradictory instance shall have yet been found. It hardly needs expressly stating that one single discovered exception is sufficient to break down an asserted law. The absence of such an instance, however, it must be equally obvious, is not sufficient for proof. But, in the second place, the positive strength of our evidence depends upon the extent of our right to claim sufficient knowledge of all the attendant circumstances of the observation or experiment.

IV. THE DANGERS OF THE ARGUMENT BY SIGN.

Under Deductive Proof, it will be remembered, we have elected to leave aside the case of complete Demonstration, since to supply a missing premiss correctly is at least as difficult as to pass it for sufficient when already expressed. It is not, however, with the whole problem of supplying missing premisses that we are now concerned: that belongs by right to the method for reducing to absurdity.

What is here called the argument by sign, as opposed to the argument by example, consists of the cases where the major premiss is either itself given as Reason, or is only suppressed through its extreme familiarity, not through any doubt as to its truth or any hesitation as to what the law may really be. When, *e.g.*, we attempt to prove innocence by means of an *alibi*, we refer no doubt to the principle (which hardly needs express statement) that a man cannot be in two places at once; and so, in a large number of instances, where the application alone is expressly given, the argument is really intended for deductive. In all cases of attempted proof, it is experience in some shape or other that is relied upon, whether already generalised experience or not; experience crystallised into names and propositions, or experience not yet so formulated. The difference between empirical and deductive proof may be further brought out by saying that in the former we deal more directly with the facts experienced, while in the latter we rely largely on mere formulas.

The chief difficulties in summing up the dangers peculiar to the Argument by Sign lie partly in the fact that faulty deduction may be due to so many different causes, and that, through disclaiming one cause while allowing another to operate, the fallacy has so many facilities for escaping open conviction; and partly in the fact that according to our own definition, it is only when both Principle and Application are clearly apprehended as such, that any argument can be rightly called deduc-

tive, and that consequently if an attempt is made to employ a Principle that does not strictly apply, it may easily be pleaded against the charge of faulty deduction, that strict deduction (Demonstration) is not intended.

Nevertheless something may, I think, be done, by recognising clearly that the danger against which every argument *professedly* deductive has to guard is the acceptance of a Principle which does not apply; and this, whether caused through ignorance of syllogistic requirements, or through verbal ambiguities, or through supposing the reciprocal of either Principle or Application to be its equivalent. Against the easy plea that demonstration is not intended, may be brought the reminder that in such case the Thesis, so far as definitely asserted, is at first a pretender to qualities which it afterwards confesses to be wanting. So far as it really cannot be rationalised,—by bringing the underlying principle and its application into shape for rigid investigation,—so far its truth must of course remain untested, and belief in its truth either a careless or a semi-voluntary act.

It may be well, then, to glance at the operation of the three causes of faulty deduction just above enumerated. And first, of the ignorance of syllogistic requirements. By this is meant solely the ignorance, when Reason and Thesis are given, of the fact that a further assertion is implied, and of the nature and limits of such further assertion,—what must be said by it, in order to complete the deductive proof.

It may be held, and it may be true, that in actual

practice purely syllogistic fallacies very rarely occur. What on the face of them appear like syllogistic fallacies may in most cases be found on further inquiry to be really due either to false belief as to the matter, or to the tyranny of names, or to ignorance of the law of Counter-Indication, whereby the reciprocal of some true Principle is accepted as equivalent in meaning. Thus if any one argues that the prisoner is guilty, from the fact of his confusion when arrested, it is, no doubt, more probable that he believes in the *truth* of the further assertion 'confusion $\longrightarrow$ guilt,' or in the *equivalence* of this with the less questionable law that 'guilt causes (and therefore $\longrightarrow$) confusion,' than in the formal sufficiency of the latter assertion as completing the Syllogism. Still, easy and indeed self-evident as the formal requirements of reasoning are, we are bound to suppose that people are occasionally liable to look upon insufficient premisses as formally binding. In fact, there is probably one class of persons who have really acquired some power of confusing themselves in this matter, namely, those who, having learnt the moods and figures by rote for an examination, have not as yet quite succeeded in forgetting them again. Nothing could well be more confusing than an attempt to apply the cumbrous machinery of the Syllogism to arguments met with in real life. And whoever has tampered with his mother-wit by substituting for it a clumsy Logic depending on elaborate mnemonics, must no doubt pay the penalty in loss of power, so long as the mischief remains.

It is well, therefore, to remember that the Syllogistic requirements may always be clearly shown either by viewing the middle term as a *sign*, the universal trustworthiness of which sign is all-important to the proof; or, where the middle term is difficult to find, by viewing R as itself the affirmation of the antecedent (or the denial of the consequent) of a hypothetical proposition of which T (or the denial of T) forms the other term. It is not necessary in this place, however, to enter fully into the details of this operation, since in the chapter on Reduction to Absurdity (p. 298) we shall find a better opportunity for doing so. In the mean time, apart from ignorance of syllogistic requirements, and from the possibility that our supposed knowledge relied upon may be mistaken, there remain two other, and commoner, sources of error.

As regards the acceptance of the reciprocal as equivalent, not much more remains to be added to that already said. Either the Principle or the Application may be wrongly supplied in this manner, with the result that we then accept an express principle, together with an express supposed application thereof, when in fact the latter is merely the application of a very different principle,—and one, it may be, very much easier to prove. Especially is this the case, as pointed out above, in the disjunctive (or dilemmatic) argument: M $\longrightarrow$ non-$\mathfrak{S}$ is nearly always easier to establish than non-M $\longrightarrow$ $\mathfrak{S}$; and accordingly, wherever in a deductive argument the R states that S $\longrightarrow$ non-M, we need to be especially on

guard. But in all cases of attempted deductive proof, this fallacy is a constant source of danger. And its insidious nature and the facilities for escape which, even when detected and arrested, it presents, mark it out as deserving very careful attention.

So great are the facilities for escape that it is difficult to find instances which will be unhesitatingly accepted as such, even by a respectable minority of readers. The danger is so simple, so obvious when pointed out, that those who have not had occasion to study the causes of fallacy in actual operation will be loth to accuse the human intellect in general of ever being in the least affected by it: while even those who have watched the action of erroneous reasoning most carefully must hesitate to say in the given case that this cause was solely, or even mainly, operative. The logician is in fact here placed in much the same difficulty as so frequently occurs in all interpretation of *motives:* several motives have had a share in some action, and amongst them, in the vaguest and most unconscious manner, one motive less noble than the rest; a motive which the person accused will be not only sure to deny, but which, if he had been conscious of it at the time of acting, he would at once have dismissed as unworthy. As a matter of fact it may have had considerable weight, and yet if the case is brought forward as an instance of its operation, a feeling of perfectly honest virtuous indignation is aroused. So it is with this deductive fallacy. A person who has really been partly misled by it will be almost sure to declare, when

the fallacy is pointed out, either that he meant the Principle to cut both ways, or else that he only intended to make a suggestion or to raise a presumption,—"complete demonstration being unattainable:" and quite probably both of these intentions were really present to his mind in a vague way, *along with* some uncertainty as to what the requirements of complete demonstration might be. For just as a man is seldom conscious of his own motives at the time, while on after reflection the nobler motives are apt to rise into undue prominence, so our view of what constitutes complete demonstration is often clearer on after reflection than in the heat of argument or during the first glow of belief.

Nevertheless, there is on occasion something gained by forcing even the most unworthy motives into prominence, in order that they may be definitely disclaimed and the disclaimer registered for future use; and so with this kind of fallacy. Where the argument is plainly intended for deductive, time may often be saved by searching first for any slackness in the view of what deductive proof really demands. If on inquiry it turns out that the intention was merely to raise a loose presumption in favour of the view, the looseness of the presumption may be thus made fully evident: while if the reciprocal of the express principle is believed to be *also* true, this belief can then be placed on its trial.

The remaining source of danger in deductive arguments may be described as that of forgetting part of the postulated meaning of the names employed, or again, of

reading into them meanings which they are not intended to bear. So far as significant names are employed in Proof (whether as M or S or S) the two liabilities to error are at bottom the same as those already mentioned,—undue neglect of difference or of resemblance. The meaning of every name, we have seen (p. 108) contains two elements,—the differential and the generic, —and either of these may be unduly overlooked. We may, in other words, unduly neglect the negative or the positive meaning, the points of difference from other things or the points of resemblance to some of them, to which the name refers.

This double chance of error is one that was treated at some length by Aristotle, under the name of the *Fallacia Accidentis*, or confusion of the accidental with the essential. It is true that if we interpret *Fallacia Accidentis* as widely as possible, it will include far more than these merely verbal errors, namely, the errors also to which empirical proof, as such, is liable. When we reason by false Analogy, or when we explicitly frame too sweeping a generalisation, we are taking 'accidental' resemblance for essential (or essential difference for accidental); and *vice versâ* when we fall short of the ideal on the other side; but it was the interpretation of names that Aristotle seems to have had chiefly in view. There is another phrase also sometimes applied to the same double chance of error; the possibility of arguing *a dicto simpliciter ad dictum secundum quid*, or *a dicto secundum quid ad dictum simpliciter;* and perhaps this supplies the more really descriptive title.

Everything that can be named may be viewed as existing at once *simpliciter* and *secundum quid* (or as belonging to a genus and also possessing a difference). Everything belongs to certain classes, the narrower * of which possess difference over and above the broader, and beyond the narrowest of all remains any real individual peculiarity of the thing in question. Accordingly any *general* name we give to a thing neglects of necessity more or less of its *secundum quid*, and yet in order to employ deductive proof we are obliged to use general (*i.e.* significant, or indicating) names. S may be rightly called M, but it is also always something more: all depends (as we have seen in speaking of Analogy) on whether the something more is important or unimportant (essential or accidental) for the purpose in hand.

But suppose that the difference is ruled unimportant and that M is decided to fairly deserve the name of S, that name in turn has a differential and a generic meaning, either of which may be unduly overlooked; and so on for ever. Take the name 'man.' Because a man is certainly an animal, or a 'creature,' or even a 'thing,' or a 'figure,' or an 'object,' we do not thereby gain the right to forget the differential qualities due to his human nature: nor on the other hand does the fact of his rationality do away with the chain that binds him to the wider class of 'animals,' or with the consequences (such as mortality) therein implied. If men, through developing their *differ-*

* *I.e.* narrower by direct limitation, not merely those which happen to have the fewest members.

entia from beasts still further, should eventually manage to conquer death, some of our old nomenclature would require remodelling, but the logical law would of course remain unaltered.

The traditional examples of this fallacy are valuable rather as being unmistakable than as really representative of the difficulty involved. "You are not a man; for a man is what I am, and you are not what I am," or "You ate raw meat to-day; for you bought raw meat in the market yesterday, and to-day you ate that which you bought yesterday in the market." Practically such catches as these are obvious to any child, and in order to exemplify the working of the real danger we must choose a finer shade of it. For this purpose the best examples of neglecting difference are perhaps the cases where some judgment is based upon what may be called a partial or one-sided view of the S: where the name with which the S is labelled is incompletely defined, defined by *genus*, without the full *differentia;* as where a soldier is said to be "a man who makes a contract with his country to kill anybody whom his country wishes to have killed." In reality, of course, the soldier does not make this contract *simpliciter*, but there are other elements in it, which when taken into account may perhaps alter radically our opinion of his merits. Or again, voluntary death is sometimes heroic; and suicide is certainly always voluntary death,—but with a *difference* added. Voluntary death is the *genus* under which 'suicide' comes, but the specific difference is just the fact that the motive is merely

to escape, for ourselves, something which, rightly or wrongly, we regard as worse than death, not a 'heroic' thoughtlessness for ourselves and regard for the good of others.

For examples of neglecting resemblance we may take the cases where difference is believed to be thoroughgoing or fundamental, merely, or mainly, from the fact of different names being used. Readers of Newman's *Grammar of Assent* will remember, for instance, the importance there given to the difference between an assertion and a conclusion. The two names are different, and the two things are certainly so far different that an assertion may sometimes be made "without grounds," while a conclusion (by its definition) presupposes grounds, weak or strong. But a conclusion means, of course, an assertion and something more: it belongs to the *genus* assertion, but possesses also the *differentia* "reasoned." Newman indeed prefers to say (p. 2) that an assertion has "got beyond being a mere conclusion," but by this it appears (p. 4) he means merely that unhesitating faith is stronger than faith which (p. 1) consciously depends on a prior *condition* being true. His interest, however, is to make out that a conclusion is radically different from (*i.e.* does not even belong to the *genus*) assertion, and for this purpose he dwells at some length on the specific difference (the presence, and the absence, of reference to grounds).*

* It should be mentioned, however, that at the end of the section (p. 6) this is felt to be hardly sufficient, and another supposed point of

difference has to be brought forward, resting on a less interesting or important verbal confusion. "We cannot give our assent to the proposi- that 'x is y' till we are told something about one or other of the terms" [I should rather say, *both* the terms]; "but we can infer, if 'x is y, and y is z, that x is z,' whether we know the meaning of x and z or no." The merest beginner in logic will recognise at once that 'x is z' does not stand here for a single, meaningless, proposition, but merely for an indefinite variety of possible propositions with a meaning. All that is said in saying that in such a case we recognise the reasoned truth of 'x is z' is that (with these premisses admitted) we see clearly that x, y, and z may mean *anything* whatever, without affecting the validity of the conclusion.

CHAPTER VII.

REDUCTIO AD ABSURDUM.

HAVING thus spent some trouble over the inquiry what can be done to improve our methods of finding offhand the source or cause of a piece of faulty reasoning, it is with a feeling of relief that we now turn away from the difficulties of guesswork, treading again upon firmer ground. Any discussion of the best means of promptly discovering the actual seat of a fallacy is likely to raise more difficulties to the mind of the thoughtful reader than it can settle for him. He will feel, at the end, that educated tact and insight are of higher value for such a purpose than any number of condensed rules can be. The special circumstances encountered in actual arguments are plainly too various to admit of hard and fast legislation, and the most that can be hoped is that some aid may have been given in clearing away preliminary confusion; rendering it to that extent more easy for further small advances to be made. But now there remains the question, Where guesswork fails, what then? The answer has been briefly given already,—once, and

directly, on p. 174, and on other occasions (as on pp. 27, 114, 213) by implication: but it now becomes necessary to deal more fully with it, and to show what is meant by "applying the method with sufficient fairness and caution."

The Reduction to Absurdity, it was also said above, is a method of raising objections which is ultimately applicable in all cases without exception; and the plans of attack already hinted at are only to be preferred to it on the ground of their greater directness in certain cases. It should, however, be at once explained that the name 'Reduction to absurdity' is here to be employed in a somewhat narrower sense than usual. To reduce any assertion,—simple assertion or argument,—to absurdity is always, at bottom, to bring it somehow into conflict with observed or admitted fact; and this may of course be done in various ways. For example, to produce a contradictory instance might fairly be called a mode of reduction to absurdity: or again, more widely still, to bring to light the absurd *consequences* of any hypothesis. But, as applied to arguments, rather than to assertions in general, we may define the process of reducing to absurdity more narrowly, restricting it to one special method, in default of a better name to use for the purpose. In all arguments as a last resource—and in some even as the most direct attack—we have the power of combining R and T, inquiring what they together imply, and then comparing such further assertion with observed or admitted facts. For simplicity let us denote "required

further assertion" in every case by the letter F; then the reduction of an argument to absurdity (as the name will here be used) means the objection that, T and R being given, F is *untrue.**

The fact that every Thesis deductively proved,—every syllogistic conclusion—rests upon some law, or Principle, from which its deduction takes place, has been already sufficiently noticed, the two premisses of every Syllogism being respectively:—

(1.) The major premiss,—the statement of such law: and

(2.) The minor premiss,—the application of it to the case in hand:

and whichever of these be given as R, the other is implied before R's 'formal adequacy' is complete. But now it remains to be said that every R must be translatable into one of these,—major or minor premiss,—before we can proceed to *fully* test the argument.† This was in fact the meaning of saying that all Proof, so far as really Proof, is deductive, and that the Syllogism is "perfectly

* It must be noticed that F is not *contained* in the meaning of T and R together in the same way exactly as T is contained in the meaning of R and F; but it is as truly *implied* by them nevertheless. And if that which T and R together imply be found untrue, the argument is clearly overthrown: for R, regarded as a firm support for T, is found to require as true a proposition which is in fact (or by admission) not so. It makes no difference whether F be Principle or Application: unless both of these are true, T remains without the required foundation.

† Hence a prior condition to the employment of the method is agreement as to the meaning of the assertions made in T and R.

general in its operation: applies to all Proof whatever, and is not an engine to be used in deductive inference merely." That is to say, whenever any Reason is given for any Thesis, a knowledge of syllogistic requirements will enable us to see how far such attempted Proof falls short of Demonstration; or, in other words, to see what further assertion must in every case be added to R before its formal adequacy is complete;—before all has been done except to inquire whether R is *true* in fact. Wherever any Reason is given for any Thesis, and the special dangers of the argument are not immediately apparent, hostile criticism falls back at once on the inquiry, What are the gaps in the reasoning that possibly require to be filled?

The Axiom of the Syllogism, whether stated in 'extension' (*i.e.* with direct reference to the 'things' spoken of), in the famous *Dictum de omni et nullo*,—which being rendered into English says in effect, "Whatever is asserted (affirmed or denied) of a class is asserted of any part of that class,"—or in comprehension (*i.e.* with direct reference to the judgment made) in the equally famous *Nota notæ*, which we may translate,—"A sign (S) of a sign (M) of $\mathfrak{P}$, itself indicates $\mathfrak{P}$";—the Axiom of the Syllogism requires, for purposes of Proof, to be postulated true in its 'reciprocal' form. The statement so obtained might be not improperly named the *Dictum de singulo* or the *Nota rei ipsius*. It says that in order to prove anything true of a single thing (whether object, quality, event, or whatever the thing may be)

it must also be shown to be true of a whole class of such things, a class including the one observed. Or, stated in comprehension,—In order to prove that S $\longrightarrow$ $\mathfrak{S}$, S must be shown to indicate M, a sign of $\mathfrak{S}$.

Let no one think these postulates either a valuable discovery in Logic, or an unwarranted and presumptuous innovation. They are merely another way of making the familiar assumption that "Nature is uniform," or that there are 'laws' of sequence and coexistence. It is on this assumption that all explanation, classification, and prediction necessarily proceed. Without it the Universe would be a chaos of exceptional cases,—if 'exceptions' can be pictured apart from 'rules' at all. Every individual thing represents a class, of which it is a member; everything belongs to some *genus*, besides possessing a *differentia*. Accordingly, whenever any fact is appealed to as reason for believing any assertion, the important matter is to get the supposed underlying law (or laws) clearly stated; and the central difficulty involved is that of really rising above the individual case while at the same time avoiding the unfairness, or the pedantry, of insisting that a wider, and therefore more vulnerable, law is implied than the assertor really intends. It is true that R is sometimes, though seldom, the statement of the law itself,—as in the argument that "Protective duties are economical: for whatever brings in money enriches:" or again, "The farmers will not pay in rent more than the net produce of their farms, for no trading class will continue a losing business." But here

no real difficulty can arise, except through verbal ambiguities, and, sometimes, through uncertainty as to the Law of Counter-indication. The finding of the Application when the Principle is clearly expressed must, from the nature of the case, be always an easy matter. Supposing that, in the first of the two instances just given,—their truth or cogency does not interest us here,—"enriches" and "are economical" are used in the same sense, it needs no Logic to tell us, at this stage of the work at least, that the formal adequacy of the Reason depends on the further assertion that "Protective duties bring in money." If a Principle is laid down as Reason, even a child can seldom fail to see that its force as Reason depends on its being connected, in the only way possible, with the Subject of the Thesis. Of course there are cases conceivable, where, through accepting the reciprocal as equivalent, a wrong application may be made. But this danger has been already sufficiently discussed. We need not here go back to the *pons asinorum* of Logic.

We have to deal, then, solely with the case where R, if relevant at all, is not itself the Principle, but is either (1) directly, or (2) remotely, the Application. By a 'remote' Application is meant the case (briefly referred to on p. 210) where the S of the thesis is not expressly mentioned by the Reason. But first of the case where the Application given is as direct as possible. That is, where something is distinctly said about S as a reason for believing the assertion made of it; as in 'Gold can-

not be produced artificially, for it is an elementary substance,' or 'Whales are not fishes, for they breathe by lungs,' or 'He must be in London, for he is not at his country house.'

The whole difficulty here is as to the extent of the Principle really involved. Is it, for example, 'To be an element ⟶ incapability of artificial production,' 'To breathe by lungs ⟶ not to be a fish' (the counter equivalent of 'To be a fish ⟶ not to breathe by lungs'), 'Not to be at one's country house ⟶ to be in London' (*i.e.* '*All* who are not at their country houses are in London'); or is it the narrower assertions, '*Gold*, if an elementary substance ⟶ incapability of, etc.,' 'Breathing by lungs, when found along with *the other attributes of a whale* ⟶ non-fish,' 'If *he* is not at his country house, he must be in London'? The answer to this question furnishes the key to the distinction between fair and unfair employment of the method for reducing to absurdity. The difference between what Logic might be, and what it too often is (what perhaps its less thoughtful enemies suppose it always to be), is much like the difference between fair and unfair caricature: a difference not so much in the thing itself as in the manner in which it is interpreted, and the occasions on which it is employed. It is chiefly the inability to keep this distinction clear which has made it possible for orators to describe the Syllogism as "a contrivance for catching you in a trap and holding you fast in it."

Just as the middle term in a Syllogism (the term

appearing in both premisses) may always be viewed as a *sign*, or mark, possessed by S,—a mark which, abstractly indicating (or being a *universal* sign of) $\mathfrak{S}$, is employed to prove the conclusion; so, conversely, that which is asserted by R as indicated (abstractly or concretely) by S, may always be viewed as the middle term of a Syllogism which has yet to be completed. If S is only known to be $\mathfrak{S}$ *because it is* M, M is (according to the *Dictum de singulo*) thereby asserted to be universally a sign of $\mathfrak{S}$. If S is only known to be $\mathfrak{S}$ because, *being N*, it is M, M, when specially limited in this manner by N, is thereby asserted to be universally a sign of $\mathfrak{S}$.* The proposition MN $\longrightarrow \mathfrak{S}$ is of course just as truly 'universal' as M $\longrightarrow \mathfrak{S}$, though of narrower sweep.

Are we then, whenever we meet, put forward as Reason for any Thesis, a minor premiss which is bare of special limitation, to assume that no special limitation was present to the mind of the person so putting it forward? Yes, and No: For the purpose of getting the principle expressly defined, it is often highly desirable to assume, provisionally and fictitiously, that the wide Principle, as strictly implied by the reasoning, was believed to be true. By this means wavering uncertainty as to its falsehood may often be destroyed, and even where no shade of such hesitation existed it is a clear gain to get the real principle reduced to definiteness. But if we go beyond this employment of the method, we ourselves

* *E.g.* 'S is guilty ($\mathfrak{S}$); since, (N) though the charge is one that an innocent person would readily contradict, it has (M) never yet been expressly contradicted.'

commit probably the greater error of the two. Thus while no objection would perhaps be raised to demanding, as Principle for 'Gold cannot be produced artificially, since it is an element,' the assertion that 'all elements are incapable of artificial production,' it is obviously unfair to demand as the Principle strictly involved by 'He must be in London, since he is not at his country house,' the assertion that 'All who are not at their country houses'—still less 'All who are not at *his* country house'—'are in London,' thus neglecting the fact that other alternative places of residence exist. The absurdity, if we made such a demand, would rather lie with ourselves. In such a case as this, since there could not be any hesitation as to the suggested Principle being untrue, we should probably dispense with even the fictitious and provisional assumption of it, cutting the process short by asking at once what the special circumstances are which are supposed to limit *him* (not 'all men') to one place or the other. But there are plenty of really doubtful cases. Take further the argument 'He must be ill: for he has lost his appetite.' Here the principle really believed as foundation *might* be that 'loss of appetite universally indicates illness;' or, on the other hand, it might be merely 'if *he* has lost his appetite he must indeed be ill,'—the special circumstance thereby indirectly hinted being of course that S's appetite is known to be of a particularly unfailing kind. If the latter were the true explanation, we should of course make a grave mistake in attempting to lay upon the

assertor the burden of supporting the truth of the wider assertion; but we should be quite right in giving him the choice between doing so and narrowing it down into a shape that will fit the facts.

The method of reducing to absurdity should, then, be regarded rather as a method of putting *questions* than of making a direct assertion that an absurdity is necessarily implied. We can never really get so far behind the scenes of another person's mind as to attain complete security in guessing what the exact Principle relied upon has been. We can only say that the Principle which *appears to us* to be implied by the express statement is so and so, and that we presume he hardly intends, in fact, to rely on any such plain absurdity. He must either narrow it for our benefit, or be content to leave us unconvinced: we certainly cannot accept the argument as it stands. So far as the Principle fails to attain *some* generality wider than the T itself, so far the T remains *unrationalised*,—*i.e.* without a logical foundation: so far as the principle sacrifices security for the sake of generalisation, so far the foundation is unsound. We do not catch the assertor in a trap: we merely show him that he has chosen to place himself in a dilemma: and we then request him, for our enlightenment, to choose whichever alternative he himself prefers. If for any reason he does not like to rationalise his thesis by committing himself to any definite Principle, it is always open to him to be content to leave us unconvinced.

But there is a sense in which this may be called

stating the alternatives a little too baldly. In a certain sense there may be a flaw in our conviction, and yet not a serious chasm. There is a middle ground between complete Demonstration and total failure to justify belief. There are, in a sense, different shades of certainty; evidence varies in strength. Where we cannot get an assertion completely demonstrated from a definite and faultless principle, the next best thing is to demand that the Principle shall, if vague, be as unexceptionable as possible; if sound, as simple as possible; and that we shall know, even incompletely, what the Principle really is, and to what extent it may be trusted. Knowledge, even when in the empirical stage, is often better for practical purposes than pure ignorance would be. And this leads us to speak of the sole remaining case,—where the Reason is 'remotely' the Application.

When, for example, I argue by Analogy, and equally when I base a law on facts observed, nothing at all is said in the Reason about precisely the S of the Thesis. In the former kind of argument, as already seen, the Reason speaks of a supposed 'parallel case;' in the latter kind, of 'This (or these) S' only, not of 'All S' as in the Thesis. So again in such (very common) deductive arguments as 'A storm is brewing, for the glass has fallen rapidly,' or 'My friend is out, for there is no light in his window;' here the respective theses speak of 'a storm' and 'my friend,' while the Reasons speak of 'the glass,' and 'a light in the window.' In perhaps the majority of actual arguments we cannot say, without

great circumlocution,* that the S of the Thesis is directly spoken of by the Reason, and in the process of translating into and out of the clumsy phrases required for doing so, there are endless opportunities for verbal error to creep in.

In the analogical and the inductive arguments, it is probably in most cases the simplest plan to try directly for unsuspected and essential difference; but there can be no harm in pointing out the longer method of arriving at the further assertion involved. The completely definite underlying Principle differs radically in the two cases (Analogy and Induction), being alike only in the one point of being often highly complicated and extremely difficult to state with any exactness. In the argument from analogy the S of the Principle implied is the inventory of the (often vaguely felt and numerous) points of essential resemblance between the two parallel cases: these points of resemblance are implied by the argument to indicate Z, either universally or at least indifferently in the two cases before us. In the inductive argument the full underlying Principle is the statement that certain precautions in observation or experiment are sufficient to warrant the inference. These, it must be confessed, are nearly always too numerous for concise summation. In the presence of the almost infinite diversity of the circumstances in which observation and experiment may take place, we

* *Cf.* Jevons, *Elementary Lessons*, p. 164.—"The circumstances of the barometer falling are the circumstances of bad weather coming."

have not yet got far towards generalising the sufficient safeguards. Mill's five methods were an attempt in this direction, but, as we have seen, it is only as ideals that they are satisfactory, and the point of practical importance is always to know how near to the ideal the given experiment approaches; for which piece of 'special' knowledge an enlightened review of innumerable circumstances, and of their bearing on the case, is needed.

But if we cannot in these cases arrive at any full and definite statement of the Principle, still the method of reducing to absurdity may be of service in another way. Whatever be the S of Thesis or of Reason, the truth of the Reason as a whole is given as *indicating* that of the Thesis, and consequently (by counter-indication) the untruth of the Thesis as indicating that of the Reason. In other words, it is always asserted that *were* the Thesis untrue, the Reason *would be* untrue also: and this, if the Reason be given as true, is clearly absurd. In other words again, every argument asserts that no theory except the thesis is compatible with the reason. In yet other words, that all possible rival theories have been examined and found wanting.

Here we touch again upon the difficulties surrounding the burden of Proof. This last statement may at first almost appear as if, after all—to quote a former passage (p. 149) "the sole concern of the assertor were to frustrate, one by one, attempts at disproof made by the other side." The real case is however very different. Until he has shown that *all* such attempts are worthless, he

may have an underlying Principle indeed, but it must be one whose material truth has not yet passed our examination. In proportion to the extent of rival theory still remaining undestroyed, is the weakness of the evidence brought forward. Often these rival theories may all be summed up in one concise expression, and may in this shape be discarded *en bloc*. Thus in the analogical argument we may say that there was perhaps 'some cause' for $\mathfrak{S}$ being Z, which cause is inoperative in the case of S. That is to say, if the assertor can show some probability to the contrary, he has done more to support his assertion than if such alternative has never occurred to him or has been half-consciously suppressed as inconvenient. So in the inductive argument we may sum up the alternatives by saying that perhaps the law is stated too widely, and here again there are ways of showing what has been done to limit its sweep as carefully as possible: and also ways of letting out the secret that we have gladly caught at the first explanation, and afterwards obstinately refused to see its obvious faults.

In this employment, however, of the Reduction to Absurdity, as well as in the easier case first noticed, the attitude of fair investigation is still the same. The essential characteristic of it is that it avoids dogmatic assertion, and merely asks to see what has really been done to stop the gaps in the reasoning or to minimise the opportunities of error. It is noteworthy that in other matters also the same negative, anti-dogmatic tendency has always been observable in Logic. Even when Logic

undertook to interpret to some extent the meaning of words and phrases off-hand, we find at least a strong inclination to bind them down to the least amount of positive assertion which the words could be supposed to contain. 'Some' meant 'not-none' instead of 'some only;' the universal affirmative could not by itself be taken to express reciprocal indication; the Principle of Logical Division treats A and not-A as equal in importance; and quite recently we have had, in Mr. Venn's *Symbolic Logic*, a more consistent following out of the plan of interpreting statements merely by what they deny, than had ever before been openly and distinctly attempted. Logic is in far more danger of losing its operative power in hesitation and inactivity through extreme desire for fairness, than of lending any aid to unfair quibbling, or of trying ingeniously to make the worse appear the better reason.

An additional circumstance, another straw helping to show the direction in which the current of Logic sets, may be found in the fact that so often its enemies are merely talkers who dislike the check that reason always gives to ready dogmatism; reasoners who care more to do their reasoning easily than correctly, or who have not yet become aware that any great need for caution exists. It is chiefly because they lack the calmness and strength required for looking difficulties in the face, and because Logic contents itself with asking whether they have really done so, that they dislike its methods. I do not mean, however, that the wish to

assert without foundation is the only explanation of all possible objections to Logic, and before quitting the subject it may be worth while even briefly to notice some of the more disturbing things that can be genuinely urged against the science. As already sufficiently explained, however, I can here attempt to notice only those objections that may arise before Philosophy,—as cut loose from all merely practical considerations,—is brought to bear upon the question.

CHAPTER VIII.

SOME OBJECTIONS TO LOGIC.

THE practical objections to Logic, other than those merely felt without the trouble of thought or inquiry, seem to me broadly divisible into two groups: those which claim that the logical attitude is on the whole useless, or worse; as for instance that, consistently held, it means pure stagnation or scepticism, and that even a partly inconsistent holding of it is apt to leave us too long undecided: and those which admit that the end is good, but declare that the means are clumsy.

The former of these is certainly the more serious of the two, and, as said above, I can in fact only provide a half-satisfactory answer. It seems impossible to deny that even our most careful reasoning may lead us into mistaken views; and strictly speaking, the more we recognise this fact, the less room must there be for active faith.

But it is one thing, after all, to admit the fact and quite another to admit the hasty inference sometimes drawn from it. It is not true that because every sup-

posed fact is ultimately uncertain, therefore there is no useful distinction to be made between a careful induction and a hasty guess. There are endless shades of difference here, and nothing is gained, except the cheapest sort of peace of mind, by shutting our eyes to them. If there are, strictly speaking, no degrees in fallibility, yet there are differences of the highest importance between the results of care and carelessness in reasoning. It is for the most part mere sloth, or even sometimes a kind of pettishness, that leads us to resolve to reason carelessly because with all possible care we may still make mistakes. Perhaps, indeed, it will be said that no one ever really "resolves to reason carelessly," and this may be granted at once. The process is commonly described in finer language. It is "humility," not slackness of purpose, that prevents our asserting positively that black does not mean white. It is "in a spirit invincibly calm" (nor can I quarrel with the epithet) that we claim a vision of "loftier than mere material verities and wider than purely physical laws." Or we contradict ourselves, and then call the result a "Mystery," or an "Antinomy of Reason," washing our hands of all responsibility, and content to lay it on the Powers that designed the faulty human intellect. The humble mind has an easy command of numerous humble phrases.

Practically the surest defence against Scepticism lies, not in claiming infallible revelations, but in patiently making the best of the truths that have stood the test

of time. Not, of course, only the few that exist now in the shape in which they were originally put forward, but also the many that have been gradually narrowed down and pared into lasting shape by persistent hostile forces. On these we 'ancients' build, as on a basis always growing firmer:—though in recognising the fact, we of course admit that our basis is never completely firm. But just in this recognition lies the life and strength of science; for the admission gives a power to discover and correct mistakes, and also tends to weaken the natural petty desire to pose as supernaturally knowing. Free from the fear of being found an impostor, science is able to challenge—and to court—correction: more than it loses in influence by being proved mistaken, it gains by being known as honest, and it adds a further gain by registering the mistake. Knowledge is built upon a mass of prejudices, possibly, but one difference between scientific and unscientific prejudices is that the former are chiefly recognised as provisional merely. If it were not for these strong provisional prejudices, Science would hardly have reached the results already won. Until they practically fail these may be trusted, and where they are proved in any case fallacious we only learn a further piece of knowledge, and so really add to, not weaken, our old foundations. Logic is fond enough of reminding us that "All men are fallible:" but the rider must be added that it depends largely on ourselves to say to what extent we choose to live under the sway of fallacy.

And as to unpractical hesitation, again we may appeal

to results. It is easy of course to assert that these have been reached by Common Sense in spite of Logic, and in one sense possibly this may be true. But that is an objection to a name, and not to a process: whether 'logic' or not, it is consistency of thought, deep analysis of supposed simple phenomena, and recognition of possible unknown antecedents, to which the results have been mainly due. To refuse all belief until we reach absolute demonstration would of course be an unpractical habit; but between doing this and merely recognising the possible loopholes of error, there is all the difference that exists between standing still and moving cautiously.

It is clear too that these more fundamental objections to careful inquiry would come with greater force if they were once for all to declare their exact position unmistakably. At present they are apt to shift their ground too fast to hold it firmly. Science finds itself between two apparently contradictory objections, both often coming from the same objector,—that it is too dogmatic, and also not dogmatic enough. Either on the whole, or on any given point, one or other of these charges may be true; but it would at least tend to enable us to correct our errors, if the charges were to cease to destroy each other.

A more insidious form that this objection to Logic, and defence of Fallacy, sometimes takes, closely resembles the attitude of loose, good-humoured Optimism towards the problem of Evil. Since Fallacy is a fact in Nature, let us recognise it as part of the wisely-ordered

scheme of things, without which Nature would be 'incomplete.' To hold it merely for an enemy is 'narrow' and 'one-sided.' Or let us view it, at the lowest, as useful manure to raise the crops of reason. Nearly all the more important theories we possess have been preceded by a number of false ones, and without the latter the former could never have been attained. Only the sluggard never commits a fallacy. A touch of madness is usually found along with the highest genius, and no one is good for much who lacks a spice of the fool.

This is, of course, an unduly brief account of the view here spoken of; and it is eminently a view that will hardly bear so definitely stating, but needs as much dilution as possible. Perhaps, however, it will serve to show what is intended, more especially as the statement given above does mix up—just as the easy optimists commonly do—two quite distinct, and mutually destructive, defences, neither of which would be found so satisfactory by itself. The first of these,—that Fallacy is a part of our total nature, and therefore worthy of our respect, rests on a merely verbal confusion, and one which no man has ever yet quite been able to preserve consistently. If Fallacy is a part of our nature, so, surely, is the power to recognise Fallacy as unprofitable, and the wish to avoid it as far as we can. There is hardly any element of human nature really stronger than the wish to discriminate between truth and error,—except perhaps the wish to keep the still wider distinction of good and evil clear. While we are about worshipping our instincts,

why neglect the most fruitful and persistent of them all? That the view has a certain charm, over and above the mere refreshing effect of the paradox, will be readily admitted by most people. It is often a great relief, and sometimes has a healing and strengthening effect, to feel free to relax our wakefulness a little. But the thing can be very easily pushed over into an absurdity,—or, what is worse, can be accepted as a serious theory by minds that might otherwise have kept or attained some vigour. To yield to it to any great extent is as enfeebling to the mind as long-continued sensuous luxury to the body: the comfortable sentiment, "I am sufficient as I am," may be of use now and then as a piece of rather open self-deception, but a mind that truly and firmly held such belief for any considerable length of time would miss the bracing effect of a struggle for improvement.

The second defence,—that error often leads to truth,—has this advantage over the first, that it does preserve the distinction between the preferable and the unpreferable. And so long as this is clearly and consistently done, I do not see that we need at all object to recognise the fact. But this is certainly no argument for remaining in an error longer than we can help. By all means admit that liability to error is part of the price we have to pay for forward movement; but are we to pay the price and then contentedly forget to carry home the purchase? The transaction needs again to be viewed from both sides instead of from one only. Rather than stop short at the fact that fallacy has its uses, we need to remember that

it is *only* justifiable when it has really led to the good results; and this is apt to be sometimes forgotten. There is, however, one purpose for which the view in question seems to me to have considerable value, and that is, to force us to see that a man who commits even a large number of fallacies is by no means necessarily a fool. I do not mean that this is an advantage only so far as it leads us into charity towards opponents, but also, and chiefly, that it tends to weaken the weight of mere authority as regards any given question: a man may have all the wisdom and learning of an Aristotle, and yet be quite mistaken on a given important point. The recognition of this fact tends to make us value conclusions more on their own merits and less on the merits of those who advance them.

Such, in rough outline, are the chief objections of this class. On the whole, I think we may say, that when viewed as mere protests against the opposite extreme, they often have a value. But they are too seductive in themselves, too gratifying to common vanity, and too open to employment as simple excuses for idleness, to remain always in their proper place, and as a rule their professed exponents appear by no means conscious of the needed limitations.

As regards the objection that Logic is too slow and clumsy to be of the highest practical service, there seems little to be said, except to admit the fact, and even to urge it as a reason for doing all we can to improve the methods of fighting fallacy. It seems undeniable

that there is an artificial rigidity about all definition, a false simplicity about analysis, a standing failure in all attempts to cram the universe into labelled nutshells. Where Proof depends on many intricate special circumstances taken together, the analytical habit of mind may often be disastrous. There are plenty of valuable facts too shadowy for Proof, and plenty of occasions where, if we had to wait for logical investigation, the opportunity would be gone,—"there being," as Bishop Warburton expressed it, "no worse practical men than those who require more evidence than is necessary." If common sense is rough, Logic, at least, is far from ready, and sometimes its pretended deeper insight is practically either futile or misleading: for Logic is bound by language, and language always hangs a little behind the newest glimpses of truth.

The facts being admitted, it is much easier to find this fault with any existing system of Logic than to supply a better system: and if the objection were brought solely, or mainly, by those who know something of the difficulties to be encountered, every one who cares about the matter would welcome it gladly. Unfortunately this cannot be said to be the case. The alternative everywhere suggested by these objectors is one which growing experience has always been steadily finding, on the whole, untrustworthy. Whether we call the alternative 'common sense' or 'intuition,' its fault is the same,—that, where it really exists, it is so truly a better instrument than slow and deliberate reason,

that people are apt to claim, or to imagine, they possess it, when they really possess it not. It is open to any lunatic to know by intuition that he is the angel Gabriel, just as it was formerly open to common sense to see that the Sun went round the Earth, or to feel that the Antipodes were a plain absurdity.

In the face of omnipresent illusion, and of possible lunacy, it seems that we must often be content to sacrifice speed, at least, in the attempt to get the most objective standard possible. Whether breadth of view need really be sacrificed depends chiefly on the time at disposal in the given case, partly also on our power of employing highly general words or symbols. But what is here contended is, that whatever be the sacrifice required, it is safer to make it than to imagine the other alternative really preferable on the whole. It is not claimed that whenever we are called upon to reason we shall gain by deliberately reducing the process to formulas. But what is claimed is that unless we have the power to do so, we have nothing else to keep our reasonings straight. There are two distinguishable states of mind in which slow and deliberate reasoning is now and then dispensed with,—one the *reasoned* belief that in a given case, or set of cases, it is better to trust to rapid insight, doing this, however, with all the care available and with a clear recognition of the danger; and the other, the far commoner state of mind, composed partly of mere easy-going ignorance of the difficulties, partly of dim and floating views of important truths, and largely perhaps dependent

on more purely physical conditions. These are, at least, the two ends of the scale: no one is, quite consistently, either an angel or a fool, either a doubter or a seer; and even the man who follows his 'moods' has a reasoning mood amongst others. But still we may class men broadly in two opposite camps, according as, on the whole, they are for or against the deliberate use of reason. In the former case, we occasionally make a compromise and voluntarily accept what seems to us in the special instance the smaller of two evils; in the latter case,—and hence, no doubt, its popularity,—we know little or nothing of evils or of danger, but merely glow with faith in our penetration, and with honest anger at any attempt to call the results in question. If, as so often happens in the latter case, we are also gifted with eloquence, it lies in our power to do much harm to those who have not yet declared for either side. It is easy enough to paint Insight in florid and striking colours, Reason as cold and dismal: and the weaker brethren are always glad of a powerfully phrased excuse.

There is, no doubt, much to be said against the careful employment of reason; but it is not the whole story, nor even the most important part of it. The practical problem is, how to make use of logic without spoiling our common sense, or how to make use of our common sense with rather less common discretion. Impatience with logical method may no doubt here and there be justified, whether in Philosophy or in looser

regions of thought; but far more often it is merely an expression of the unchecked desire to run before we have learnt to walk. Here and there it is plain that the impatience springs from a genuine wish for improvement in our methods, but far more often it flows either from idleness or from being unaware that there are any methods to improve. And in any case, though we may appreciate the good intention shown, as yet the fruits are wanting. If logical method as at present known is insufficient, the sole alternative is unmethodic speculation, which on the whole is less sufficient still. It is open to any one to sit down and dream that to him alone has been given the key of all knowledge—or of any given piece of knowledge,—without any laborious precautions. And perhaps he may be right. But how is he, after all, to be sure of this on reflection, and how are his friends to know it, and the other people with different dreams of their own? Whether the seer needs an objective standard or not, he will hardly deny that rival seers need one: and in their case, at least, he finds, just as the scoffers do, that the calm security of inspiration is difficult to distinguish from a child's untroubled conceit.

CONCLUSION.

SUMMARY.

To challenge attack is of the essence of 'real' assertion, and the kind of challenge depends on the confidence with which the assertion is made. Sometimes we speak as having fully considered the question; sometimes as rather waiting to hear, as a novelty, what may be said on the other side. It is with the former case only that we have been here concerned, and for convenience in describing this kind of assertion we have employed the ancient name of Thesis.

The first of the dangers that a Thesis has to run, we found to be that of containing the empty form of assertion without the substance. If no real meaning be understood by the hearer, to him the thesis is non-existent, whether for acceptance or attack. And the hearer alone can decide how far the meaning is real.

When the meaning is real and clear—or sufficiently clear for its purpose—the second danger is that of supposing that a thesis, to be left unaccepted, stands in need of Disproof. And here the distinction between Disbelief

and Unbelief is all-important: or, however the states of mind be named, the thing to remember is that so long as a thesis is unsupported it has not yet been shown to be either true or false; that although it claims to be true, its claim is not yet made out. The attempt to support an assertion by asking what can be said against it, may be met by replying that at present we know nothing against it, but this much against accepting it—that we see no reason to believe. He who asserts may choose between the two alternatives—producing reasons to satisfy the inquirer, or leaving him unconvinced.

And lastly, when reasons are brought forward, the question at once arises, how far the proof comes short of being conclusive: or what are the gaps remaining before Demonstration is complete. And having found these (as they appear to the inquirer), the safe and fair attack is still to ask for information: not necessarily to accuse the assertor of absurdity; only to force him to take care that he in fact avoids it.

But to view the office of Logic as consisting purely in sceptical attack, is itself a kind of artifice, undertaken with a far more useful purpose in view. It is not the seizing of firm positions in verbal controversy that is the chief aim of logical method, but the power thus gained may be used as a means to a further end. Since *a priori* any belief may be erroneous, and especially since we have already often found ourselves and others mistaken, there is a certain use in learning to treat ourselves as the wary debater would treat a less wary opponent. The

attack on any erroneous belief must come either before or after its acceptance has led us into actual error. The practical purpose of Logic is to enable us to forestall the possible attacks, and so to guard against the consequences of credulity. Logic thus aims at the adoption only of those beliefs that cannot fairly be avoided, and its operation is in the first place mainly to restrict the natural exuberance of belief.

It is not necessary here to repeat in any completeness of detail all the separate points of doctrine on which the science of Logic depends: nor can I, indeed, pretend to be able to sum them up in the most concise available form. Apart from metaphysical difficulties, the latter operation would demand both a wider symbolic language than is at present accepted, and also a more universal practice of handling symbols easily and reading their application. Expressed in more highly general language than we have, the logical doctrines that are of chief importance from the practical point of view would probably be few in number, simple in nature, far-reaching in their application, and true under all conditions of their use. Such as we have already are, when wrongly interpreted, open of course to easy caricature—as every pun and every verbal puzzle bears witness: but, interpreted fairly, we need never be afraid of trusting our weight upon them. Like Science in general, Logic exists for a purpose, and wherever it fails to attain that purpose the failure merely needs incorporation into our statement of its laws. Thus we may use, for example, the law of Con-

tradiction, while fully admitting that the line between A and not-A is a contrivance of our own: or we may use the Reduction to Absurdity while recognising that it only asks a question. But without attempting here to draw up the list of doctrines, it may be of use to select as landmarks for memory some of the salient features of the science.

The first of these I hold to be the negative attitude above spoken of. And the second, all that is included under the name Consistency. As already shown, this contains much more than what is commonly meant by 'abiding by our assertions,' namely the whole problem of bringing to light the hidden implications underlying a thesis, and especially the large assertion implied in every confident theory—that all possible conflicting theories are to be discarded. That this demand, if strictly enforced, would be a bar to all belief, may be freely admitted. What Logic is concerned to do is, not to remove all theoretical doubts, but to force us into recognising as clearly as possible their actual extent and power in the given case. As a first means of pointing out the dangers, it sets up an ideal type of Demonstration, and then demands not that we shall reach this but that we shall know clearly how far short of it we fall: for it finds that until the distinction between proven and not-proven is apprehended with some real distinctness, there is no chance of dealing successfully with the endless complications due to varying degrees of strength in evidence. The more we inquire into the main sources of error, the

more clearly we see that ignorance of danger is at once the commonest and the only one that we can certainly remove. Hence the central purpose, for practice, is to find the gaps in Proof remaining to be filled.

The definable term, the abstract proposition, and the argument, have this in common, that each is capable of being viewed as expressing an indication. Given the general name, and any of the essential attributes follow; given the S of an abstract proposition, and the $\mathfrak{S}$ follows; given the Reason and the Thesis follows. And to each of the three the rule of counter-indication applies: deny an essential attribute and we deny the name; deny $\mathfrak{S}$ and we deny S; deny the Thesis and the relevant Reason is denied.

In the attainment of Consistency the Law of counter-indication has two chief uses; first that of restraining us from taking two distinct assertions as equivalent, and secondly as a means of helping to bring to light the hidden implications. In the former, or negative, aspect it operates chiefly by preventing us from proving some easy proposition under the belief that we thereby prove its reciprocal also. In the positive aspect the chief value of the law is in helping to explain the syllogistic process. But such explanation demands—

Next, the assumption that every isolated fact comes under a wider law. This doctrine lies at the root of Proof and of Explanation equally. To prove a thesis, we need to show it as a case under some Principle—just as, to explain a name we have to mention a *genus*,

or as to explain a fact we have to bring it under a law. And of that Principle the thesis may be either a denial of the antecedent (S), or an affirmation of the consequent ($\breve{S}$): while the Reason either denies the consequent or affirms the antecedent. By means of Thesis and Reason together we can thus find the law implied.

Lastly, there is the doctrine that every isolated fact is further analysable—that besides belonging to a *genus*, it possesses also a *specific difference*. And that, in order to view such fact correctly we need to bear its differential qualities in mind. The eye for *genus* thus leads us to attempt to establish our thesis deductively, while the eye for *differentia* becomes the main safeguard of induction. While, then, we continue to assume, as a basis for practical proof, that all 'things' belong to classes, the names of which may be used as indicating certain facts about them, Inductive Logic teaches us to cultivate the eye for difference,—to keep refining away what passed at first sight as indivisible, and breaking down ancient barriers that perhaps have served some useful purpose but were better suited to clumsier needs than ours. Deductive Logic insists that conclusiveness depends on indication,—the trustworthiness of laws; inductive Logic leads us to revise the laws themselves, and put us on guard against accepting them too widely. The power of seeing finer shades of difference is on the whole the best and most lasting result of logical training, and affords most help in the rapid detection of fallacy.

These seem to be, in briefest outline, the more important points to keep in mind: but as thus shortly stated they can only be of use as memoranda, not as in themselves by any means sufficient statements of all that is required for practice. Nor, certainly, would such sufficient statements be easy to frame. It is not theory alone that can ever fully enable us to preserve the golden mean between faith and hesitation. So commonly is this fact recognised, however, that it will be well if we can avoid going far beyond it and accepting the easy view that Theory and Practice must for ever carry on a hopeless warfare, and that, so often as our weak attempts at theory fail to fit the facts, it is sufficient to plead the possession of a highly practical spirit. Perhaps one chief source of difficulty here is the habit of supposing that Logic wishes to dictate instructions for belief,—saying, for example, "This you may consider sufficiently certain, but that you shall not accept." No logic can really lay claim to so supreme an authority. It is wiser to admit that men are perfectly free to form their beliefs, if they choose, with the aid even of self-deception. The most that Logic can hope to do, for practice, is to help us to know the dangers of uncriticised belief; it is entirely our own concern if we afterwards prefer, in a given case, to disregard them. The risks however remain, whether we care to remember them or not.

APPENDIX.

A.*

ALTERNATIVE POSSIBILITIES.

As a help in recognising the alternative theories against which any abstract proposition has to show its preferability, there may be some use in setting out the *a priori* possibilities between S and $\bar{S}$ in general.

We must remember that S and $\bar{S}$ are abstracted portions of the total phenomena among which they respectively occur; portions selected and named by ourselves, for the purposes of our 'general knowledge:' the actual phenomena observed being complex wholes, mentally analysable into this that and the other circumstance, whether such circumstances be events or qualities. It should be observed, however, that when *successive* phenomena are in question these abstracted portions may always themselves be viewed as 'events,' even where so uneventful as hardly to deserve the name in popular language. Thus, where any quality of any thing changes ever so slightly,—say when a thermometer rises one degree,—we have what is here considered an 'event,' even though a caterer for news might hardly think it worth reporting. And the abstractness of such an event consists, as abstract-

* See p. 276.

ness always consists, in its detachment from surroundings: we choose to keep out of our assertion (and as far as possible, out of sight) the whole environment of S and of $\mathfrak{S}$, and to speak of these alone, labelling them with general names. For example, let S be a rise in the price of coals, and $\mathfrak{S}$ a strike among the colliers. Outside S and $\mathfrak{S}$, and simultaneous with them, is a whole universe of other events and qualities, too numerous to sum up by any narrower expression than their 'environment:' these we, by a sort of fiction, choose to neglect, attending only to S and $\mathfrak{S}$.

And first, when S is observed to happen earlier in time than $\mathfrak{S}$; if we inquire as to the various ways in which these may conceivably be related to each other in Causation, we find:—

First S may be *cause* of $\mathfrak{S}$:—

(1) as what is often loosely called the *sole cause*. That is, if S had not happened, $\mathfrak{S}$ would not have happened; all other circumstances in S's environment being 'accidental' to $\mathfrak{S}$: as where S is the passing of a bullet through a healthy man's brain, and $\mathfrak{S}$ the death of the man.

(2) S and a third circumstance, Z, may have been *jointly essential* to $\mathfrak{S}$'s happening. That is, without their combination, $\mathfrak{S}$ would not have happened: as where Z is a certain person's weak state of health, S is the arrival of fever-infection, and $\mathfrak{S}$ his consequent fever.

(3) S and Z may have *jointly contributed* to $\mathfrak{S}$'s existence, without their combination being essential to the production of $\mathfrak{S}$ at all. That is, without one of them, $\mathfrak{S}$ might have happened, but not to so great an extent or intensity: as where S and Z are a pair of horses, and $\mathfrak{S}$ the movement of the carriage.

(4) S may have been itself due to a former case of $\mathfrak{S}$, but may now be in its turn cause (whether sole or otherwise) of the present $\mathfrak{S}$: as where S is a rise in the bank-rate, and $\mathfrak{S}$ a general uneasiness in the money-market.

Secondly, S and $\mathfrak{S}$ may be *co-effects* of Z: as where S is day, $\mathfrak{S}$ is night, and Z is the earth's revolution in the sunlight: or where Z is a 'centre of depression,' S is a falling barometer, and $\mathfrak{S}$ a storm.

Thirdly, Z may have been (sole or other) cause of $\mathfrak{S}$, and S *accidental*:—

(1) *Simply* accidental, as where S is the act of blowing, $\mathfrak{S}$ is the flying open of the watch-case, and Z is the pressure of my finger on the spring. (Along with this may be classed the case where Z is the effect of S, and $\mathfrak{S}$ accidental: as where S is the arrival of a comet, Z a letter in the *Times* about it, and $\mathfrak{S}$ a war.)

(2) Z may have been the cause of $\mathfrak{S}$, and S a hindrance: as where $\mathfrak{S}$ is the flourishing state of trade in America, Z is the 'boundless resources of the country,' and S is the system of Protective Duties.

Looking next at the case of Co-existence, we shall find in the first place that unless S and $\mathfrak{S}$ stand merely for qualities (or groups of qualities), and not for events, it will be very difficult to find examples of true co-existence with direct dependence between S and $\mathfrak{S}$. In other words, where S and $\mathfrak{S}$ are two co-existent *events*, say where S is the arrival of a train at the station, and $\mathfrak{S}$ the arrival of the clock's hands at a certain position; or where S is a gale and $\mathfrak{S}$ the movement of the branches of a tree; the case is always more or less plainly resolvable either into one of co-effects, or else of innumerable repeated acts of causal sequence. As to co-

effects; if it be true that every event whose beginning we can trace has had a cause, and also that any selected portion of continuous Nature that we choose to consider separately may be bound up into a single 'event,' it is clear that the relation itself of co-existence between S and $\mathfrak{S}$ may be considered as an event, and therefore as having a cause. And thus, unless the whole assumption on which our explanation of Nature proceeds be unfounded, every case of co-existence is, strictly speaking, a case of co-effects. We have only to trace back the chain of causation far enough, and sooner or later we must come to an ancestral event common to both. But this fact, however undeniable, is of small practical value, since the interests of practice require above all things a distinction between the cases where S and $\mathfrak{S}$ are essential to each other and where they are accidental. And the sweeping general assertion made above cannot be held to deny the *apparent* (and therefore practically existent) disconnection between many cases of observed co-existence. The falling of a cab-horse in Cheapside may co-exist with a particular storm at Penzance (to go no further afield), and if we knew all the links no doubt we should be able to trace both events back to some ancestral cause, however inconceivably extensive and complex. The horse, let us say, would not have fallen unless the street had been wet, and this occurred because certain rain drops had come down in that particular place and time: the falling of the rain depended on certain atmospheric collocations and changes, and these again on others in an endless series where we soon lose all actual clue. But our whole theory of causation demands that at some time or other in the past, however remote, a change, or group of changes, took place, to which both the Penzance storm and the Cheapside accident are due, —without which neither would have happened exactly

as and when they did happen. This seems certainly demanded as a theoretical assumption: and yet, for all practical purposes, the two events in question were 'totally disconnected.' Just as, practically, there is such a thing as 'Chance,' so must we admit that many cases of co-existence are 'purely accidental,' or 'mere coincidences;' even if this means only that we have no definite knowledge of the actual chain of causation involved.

And as regards the case of innumerable repeated acts of causal sequence,—as where, for instance, a stream runs on for ages and slowly polishes a rock,—the flow of the water may be said, in rough ordinary language, to co-exist with the wearing of the stone, but the process can also easily be analysed into infinitesimal *acts* of removal of particles by abrasion,—the effect in each case coming after its cause in time. In fact, in one sense, any other explanation is inconceivable. Here again we have a case where theoretical assumptions clash with the practical needs of expression; and where, as it seems, our only resource is to yield to the latter. While admitting then that, strictly interpreted, co-existence is only of qualities, which are always co-effects of some prior cause; we must be content with a looser form of expression, and speak of co-existent events also, one of which may be either essential or accidental to the other.

Of co-existent *events* then, the conceivable cases follow closely the division above made of successive events, namely:—

First, either may be the cause of the other:—

(1) *Sole* cause; *e.g.* S the forward movement of a train and $\mathfrak{S}$ the rotation of the wheels.

(2) *Joint essential*; *e.g.* S the force of Gravity, $\mathfrak{S}$ the fall of an apple, and Z the absence of support.

(3) *Joint contributing; e.g.* S a large river,* ⅀ a large town upon the river, and Z the other causes of the size of the town.

(4) *Reactive; e.g.* S reason, and ⅀ language.

Secondly, S and ⅀ may be co-effects of Z. *E.g.* S a low thermometer, ⅀ the formation of ice, and Z frosty air.

Thirdly, the conjunction of S and ⅀ may be 'purely accidental' (*i.e.* S the effect of Z, and ⅀ of X.)

(1) *Simply; e.g.* S fine weather and ⅀ Royal review.

(2) *Obstructively;* (either existing in spite of the other). *E.g.* S liberty of the press, and ⅀ the spread of foolish theories.

Of co-existent *qualities*, only three cases need be distinguished:—

(1) S and ⅀ essential † to each other. (This case is rare.) *E.g.* S inertia, and ⅀ weight.

(2) ⅀ essential † to S. *E.g.* S human nature, and ⅀ fallibility.

(3) ⅀ accidental to S.

(*a*) *Simply;* *E.g.* S shortsightedness and ⅀ short stature.

(*β*) *Obstructively.* *E.g.* S disregard of wealth, and ⅀ possession of wealth.‡

Seeing then that when events or qualities are observed to happen in succession or co-existence, there are *a priori* these various explanations possible, how are we to rise from the

* It may seem strange to call a large river or a large town 'events,' but here the names are only used elliptically, for the growth of the town and the continued existence of the river; so too in the other cases.

† By 'essential' is here meant no more than 'constantly accompanying,' and therefore 'indicated.'

‡ This further exemplifies the difficulty noticed on p. 335, that causation is sometimes so subtle as to wear the appearance of co-existence.

observations or experiments made, to the *law* of succession or co-existence obtaining between the things? I do not mean, by what method are we to direct our guesses so as to be most quickly successful; but how, having made a theory, are we to prove it?

It will be seen, of course, that these alternatives just set out are alternatives which affect our explanation of each single observed case of sequence or co-existence. But since, in order to prove a concrete proposition satisfactorily we must always have at least one abstract proposition to rely upon, the whole importance of these alternatives is as regards the proof of abstract propositions from concrete facts observed. Before considering a law established, either by one or by many cases of observed sequence or co-existence, these alternatives have to be faced, as possible explanations of each case observed. And the immediate question in each case is, What certainty can we obtain that the alternative chosen is the right one out of all those conceivable? The methods of inductive proof may be viewed as attempts to answer this question.

B.*

THE EMPIRICAL METHODS IN DETAIL.

As Mill pointed out, the five methods—Agreement, Joint-Method, Difference, Residues, and Concomitant Variations—exemplify at bottom two methods only, Agreement and Difference, the Joint Method being merely an extension and improvement of the Method of Agreement, the Method of Residues being a peculiar modification of the Method of Difference, and the Method of Concomitant Variations being

* See p. 278.

an approach to the Method of Difference, the nearest approach attainable in certain circumstances. There are, then, two main axioms at the foundation of all the methods; the first, that whatever circumstances *can* be excluded without excluding the phenomenon whose effect (or cause) is being sought, or can be absent notwithstanding its presence, are not causally connected with it. According to this rule, accidental circumstances are gradually eliminated by observation, and the more observations the greater the chance that the truly accidental circumstances will be excluded. The remainder, those circumstances which are not eliminated by this process, are supposed to be thus shown to be essential to the phenomenon, to be the proved effect (or cause). As a concise example, we may quote from Professor Fowler, "A particular kind of food, whatever else I may eat or drink, and however various my general state of health, the temperature of the air, the climate in which I am living, and my divers other surroundings, invariably makes me ill," [let us say rather 'is invariably followed by my illness']; "I am justified in regarding it as the probable cause of my illness, and avoid it accordingly." Here the general state of health, the temperature, and the other surroundings, are the circumstances gradually eliminated, by the observations, as immaterial; and it is supposed that the only circumstance (except an uncertain number of circumstances already believed to be immaterial) common to all the instances observed, and thus surviving the process of elimination, is the 'particular kind of food.' So far, then, as the method of agreement is to be trusted, this particular food is proved to be the cause. We may guarantee, says the Method of Agreement, by means of the observed facts, the abstract proposition, "This particular kind of food (S), *whenever taken, indicates future* illness in me (P)."

The second axiom, on which the Methods of Difference,

direct and supplementary, are based, admits of a two-sided statement: "Whatever antecedent *cannot* be excluded without preventing the phenomenon, is the cause, or a condition, of that phenomenon: whatever consequent can be excluded, with no other difference in the antecedent than the absence of a particular one, is the effect of that one." * Chemistry is one of the best fields for illustration of this method. "Mix, for example," says Prof. Fowler, "chloride of mercury with iodide of potassium, and the result will be a colourless liquid at the top of the vessel, with a brilliant red precipitate at the bottom. There can be no hesitation in ascribing this result to the mixture of the two liquids." The assumption of course always is, where a change introduced into a given set of circumstances is *immediately* followed by a further change, that without the first change the circumstances would have remained as they were, that the second change would not have taken place. Thus, in the instance given, from the chloride of mercury alone, without the iodide of potassium, no red precipitate (it is assumed) would have been formed. The iodide of potassium is accordingly an "antecedent which cannot be excluded without preventing" the phenomenon observed: the consequent 'red precipitate' can be excluded with no other difference in the antecedents than the absence of the iodide of potassium. So far, then, as we may trust to the Method of Difference, we reach the law "Chloride of mercury added to iodide of potassium $\longrightarrow$ red precipitate."

We will not ask how far these methods, and the subordinate variations of them, can be trusted for proof of absolutely universal laws of sequence, whether of backward or of forward reference,—laws, *e.g.*, such as "Wherever S is found, $\mathfrak{S}$ must have been before," or "Wherever S happens, $\mathfrak{S}$ is sure to follow." Practically, as already said, we are for the

* Mill's *Logic*, vol. i. p. 450. (8th Ed.)

most part obliged to be content, in our knowledge of causal sequences, with much less than these completely universal assertions. The mass of our propositions regarding causal laws are of the milder type, "$\mathfrak{S}$ is *one* cause of S," or "S, *unless counteracting circumstances interfere*, will cause $\mathfrak{S}$ to follow." It is necessary, therefore, to inquire how far the empirical methods may be relied upon for the support of such comparatively timid assertions as these.

The Method of Agreement.

CÁNON.—*If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree is the cause (or effect) of the given phenomenon.*

It is obvious, in the first place, where the simple Method of Agreement fails. Its 'characteristic imperfection,' as Mill himself took care to show, is due to our necessity of admitting that the 'same effect' may be produced by 'different causes.' Of course, as Mr. Carveth Read puts it, an effect particularised to the full can never arise from different causes; but the very essence of these abstract propositions is that they particularise to the full neither S nor $\mathfrak{S}$, and so far as they fall short of describing an effect "in the minutest detail," so far they leave an opening for vicarious causes. The manner in which the vicariousness ('Plurality') of causes interferes with the cogency of the method is easily seen. Assume, for instance, that I have made ten observations as to the apparent 'effects' of eating salmon; having ten times observed this antecedent to be followed by indisposition. On each of these occasions there have been many other circumstances combined with it,—the other things eaten and drunk during the same period, to go no further. In order to

put the most favourable case possible for the operation of the method, we will also suppose that the salmon was the only antecedent common to all the cases of indisposition. But if vicariousness of causes be once admitted possible, there is nothing to prevent A having been the real cause on the first occasion, B on the second, C on the third, and so on; S (the salmon) having been perfectly harmless all the while,—just as harmless as some other circumstance which, though not part of the food, is invariably present in all the cases,—say the fact that Bismarck is still alive. Unless, in short, we have some *further* reason to suspect the element in question to be the guilty one (in the case supposed, *e.g.*, we may rely on popular belief, or doctor's advice, or family tradition),—unless we can bring deduction from some accepted truths to aid us, the mere method of agreement by itself can give, in such cases as these, no solid support at all.

There is, however, it will perhaps be said, one class of cases in which the unsupported method of agreement must be allowed to be practically sufficient; namely, where the cases observed are not counted by tens, but by hundreds or thousands or more. But putting aside the difficulty of settling where the sufficient number begins, and also the difficulty of finding an unmistakable instance of such a case,—for where the observations are numerous either the joint method or that of concomitant variations is usually applicable,*—what is there to prevent these thousands being all under the same limitation? "We might," as Mr. Fowler says, "pass through a field containing thousands of blue hyacinths, but this would not justify us in expecting that the next time we saw a hyacinth it would be a blue one" [say rather, 'this

* Certain axioms, *e.g.*, sometimes quoted in this connexion, seem to me to be more dependent on concomitant variations than on strict and mere agreement.

would not *prove* that all hyacinths are blue']. A large number of minor differences may be thus eliminated, and yet some important limitation may remain so as to constitute a *differentia* common to all the cases observed. In other words, besides mere number we need the assurance that these instances are fairly representative of all that exist. The field of our observation may be a large one, but there may also be other fields outside of it,—until such possibility is excluded.

The Joint Method.

These difficulties are partly met by the Joint Method, but not entirely. The Joint Method compares two *sets* of instances independently, and combines the results. Its canon is, in Mill's words:—

If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance; the circumstance in which alone the two sets of instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.

The canon itself is axiomatic, but its application is far from being secure. To test it, let us suppose the most favourable conditions; namely, that the instances observed are considerably more than two in number. Mr. Fowler again provides us with a good example—"I have observed that a certain plant is invariably plentiful on a particular soil: if, with a wide experience, I fail to find it growing on any other soil, I feel confirmed in my belief that there is in this particular soil some chemical constituent, or some peculiar combination of chemical constituents, which is highly favourable, if not essential, to the growth of the plant."

It is clear that *if* the one set of instances agree in

nothing but the presence of the two circumstances, and *if* the other set agree in nothing but their absence, there is of course no room for a vicarious cause. But it is just this further assurance which lies outside any possible *application* of the canon, and which must be added to it to complete its cogency in a given case. To refer to Mr. Fowler's example, we need assurance that besides the chemical constituents of the soil no other surroundings are invariably present and absent together with the soil,—such as climatic conditions, for example. A wider experience may always, until the contrary be shown, lead to the necessity of qualifying (*i.e.* limiting) the law arrived at. Instead of being simply "This plant, in general, ⟶ these chemical constituents in the soil," the law may be, "This plant, *under certain conditions* (of climate or otherwise), ⟶ these chemical constituents." In its simpler form the law remains liable to contradictory instances being found on a wider search.

The Method of Difference.

CANON.—*If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one only occurring in the former; the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.*

The Method of Difference may be called the sheet-anchor of empirical proof. "It . . . appears to be by the Method of Difference alone," says Mill, "that we can ever, in the way of direct experience, arrive with certainty at causes." Elsewhere we frequently hear of its "rigorous cogency."

An example has been already given,—an example which shows the strength of the method but not its weakness:

when we add iodide of potassium to chloride of mercury, we may no doubt be tolerably sure of the substances we are handling: inside a test-tube unknown antecedents have small chance of entry.

Granting, however, that this method has a practical advantage, in many cases, over the other methods; and that its results are often practically beyond cavil; on what does its certainty depend? Not, in any way, on the method *per se* but on the fact that in certain departments of inquiry (*e.g.* in chemical experiments) we are fairly in a position to obtain the *external* certainty that all the antecedents are known. So far as we can be sure that we vary only one circumstance at a time, so far we attain this external certainty: so far as we cannot get this assurance the method of Difference is no more safe than any other suggestive source of *inference*. Where, as in a chemical laboratory, we have practically entire control over surrounding circumstances, such as light, air, and temperature; where we can obtain any element, or combination, we require, in the utmost possible purity and in the exact proportion desired; there is no doubt this method may be trusted almost absolutely. But the certainty is due to the laboratory apparatus and not to the method of Difference by itself. When we come outside these highly artificial conditions, and attempt to apply the method of Difference in circumstances over which we have no control, we find ourselves constantly brought up against the fallacy *post hoc ergo propter hoc*. To show simply that in a given case when S was added to existing circumstances $\mathfrak{S}$ followed, cannot prove that $S \longrightarrow \mathfrak{S}$, unless we show at the same time that no other alteration in the existing circumstances took place,—a universal negative which in practice it is often hard to prove even approximately. In all the more complex questions, such as those of politics, character, or daily life in general,

firm proof by means of the direct method of Difference becomes nearly impossible. Witness the argument that because the addition of Free Trade to England's commercial system has been followed by periods of depressed activity, therefore the former is the cause of the latter. And the possibility of conjuring tricks is perhaps the clearest example that can be given of the effects of unguarded confidence in the direct method of Difference. When the conjurer produces startling effects by apparently insignificant causes, there are 'unknown antecedents' up his sleeve or elsewhere convenient, whose presence it has been his business to make us overlook.

The Method of Residues.

CANON.—*Subduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents.*

It is seldom that the Method of Residues can, or rather need, be employed at all as a method of proof, though as a source of inference it has often been fruitful and important. Astronomical discovery especially is full of striking results obtained by means of it: so, too, certain other departments of science. But of attempted *proof* by means of Residues merely, we are rather hampered in finding true examples. Mill himself gives no instance of its working, except in symbols, and every instance given by Professor Fowler is an instance of discovery, not of proof. Most of those given by Professor Bain are also cases where suggestive hints have been first given by this method, to be verified in other ways.

Here it is clear at once, even without examples, that all must turn upon the exhaustiveness with which the residue is narrowed down by the *known* causes and effects in the case.

The difficulties of the method of Difference are therefore here repeated, and are further increased by the fact that the required isolation of the phenomena is not actually attained, but only seen by the light of imagination. The negative instance is obtained by deduction, not by direct experience. In the last two paragraphs of Prof. Bain's exposition of the method, we obtain what seems to me a valuable hint as to its true importance for purposes of proof; namely, that it may be employed to prove a negative result,—to disprove some supposed explanation by showing that the effects can all be accounted for in other ways. Thus, if it can be shown that the known forces of inorganic matter, operating in the special collocations of organic bodies, will account for the phenomena of life without leaving a residuum, the theory of a vital force, or vital principle, becomes unnecessary. Such cases as this are perhaps those for which the method is most adapted; but here too all turns upon the "if it can be shown." This condition, and not the mere fact of employing the method at all, is the important matter.

The Method of Concomitant Variations.

CANON.—*Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.*

'Concomitant Variations' is perhaps the most commonly applied of all the inductive methods. Its application, according to Mill, is in proving "the laws of those Permanent Causes, or indestructible natural agents, which it is impossible either to exclude or to isolate; which we can neither hinder from being present, nor contrive that they shall be present alone." And it may be added that in almost all those vague

and large assertions so common in daily life, the method of Concomitant Variations is continually employed in proof. More than this, it seems (as already said) not impossible that certain Axioms, such as those of Geometry, find their best support in this method rather than in the method of Agreement. The more nearly our actual lines approach parallelism, or our magnitudes equality, the more nearly do the axioms fit the facts observed: the more one set of antecedent circumstances resembles another, the more do their respective consequents agree.* In certain cases such as these, perhaps, 'unknown antecedents' can be shown to be as improbable as a pest of mice to the mounted knight. But even here we are never quite secure against their interference, and what security we have is, as in all the former cases, gained from external sources.

Good examples, usually given, of the employment of this method are to be found in the thermometer and the pendulum. We cannot deprive a body of all heat, and we cannot entirely remove the Earth from the pendulum, nor the pendulum from the Earth; but by observing the variations we may often obtain a law which is practically as secure as if it were really obtained by the direct method of Difference. We get abundant evidence tending to show that *if* the direct method of Difference could be applied (which, by the hypothesis, it cannot), we *should* have all the cogency which that method could give us.

We should have all that cogency, but no more. For in this case, as in the case of all the other methods, we require, over and above the employment of the method itself, a further assertion on which its actual cogency in the given case shall

* *Cf.* also the use made by the late Prof. Jevons of his principle of the "Substitution of Similars," where "likeness or equivalence" is treated as purely a matter of *degree*.

depend. For Concomitant Variations, this further assertion has been expressly formulated by Prof. Fowler, as a 'rider' to the canon:—

If we can assure ourselves that there is no third phenomenon varying concurrently with these two, we may affirm that the one phenomenon is either a cause or an effect of the other.

The theory may in fact hold good only up to a certain point,—namely, so far as that third phenomenon (which let us call Z) is present; and instead of S $\longrightarrow$ $\breve{S}$, the law should be accurately expressed S (when Z is present) $\longrightarrow$ $\breve{S}$. A well-known example of this is the contraction of water by cold, down to 39°, after which it begins to expand again. Here the limitation 'above 39°' must be added to the first crude statement of the law 'water contracts with cold.'

I may add a further difficulty to which the method of concomitant variations is liable: namely, that the supposed law guaranteed by it may be a case of *ὕστερον πρότερον*. Finding that the size of towns varies concomitantly with the size of the rivers on which they are built, an incautious reasoner might conceivably arrive at the law that the size of the river was due to the size of the town. Hearing the cuckoo call its own name, he might conceivably put this down to the cleverness of the bird. Finding *Hamlet* full of 'quotations' he might suppose that Shakespeare was sadly wanting in originality. Of course, these extreme cases are mainly useful as affording food for the comic papers; but in serious inquiries such as that of the concomitant variations between new organic structures and the need for them, the fallacy is perhaps not quite unknown. Or again, take as an example the good old farmers' theory that 'blight' was either itself a *kind* of disease, or at least a *sign* of existing disease, in plants. They pictured the plant 'becoming diseased,'—much as a man's digestion might get out of

order; and, as an *effect* of this, the blight was supposed to 'come out,'—much as the man might break out in a rash, or pimples. But it seems to be now completely established that the true explanation is that blight is a kind of fungus, the spores of which take root equally in the leaves of healthy plants and unhealthy; but that, however healthy the plant may have been, the parasite drains its life, and so *causes* disease,—stunts the growth of the plant, or taxes its fruit-bearing powers, or in some way interferes with the normal state of things. It is thus often an exceedingly difficult matter to say which of two things, varying concomitantly, is cause and which is effect; and the common-sense view, based perhaps on some loose analogy, is as likely as not to reverse the sequence.

The Methods, in general.

This, then, is the difficulty attending the *application* of all the methods,—the possible presence, unsuspected, of a third phenomenon (or 'unknown antecedent') in the cases observed: so that the real law, instead of $S \longrightarrow \mathfrak{S}$, should be either $Z \longrightarrow \mathfrak{S}$, or $SZ \longrightarrow \mathfrak{S}$. The first of these two alternatives (namely that S is purely accidental to $\mathfrak{S}$) may be for practical purposes excluded by the Doctrine of Chances: the second alternative must remain in every case possible, until removed by special evidence outside and beyond the mere fact of 'employing the method.'

To sum up:—Where the Method of Agreement is employed, evidence should be further produced, to show (1) either that every element but S and $\mathfrak{S}$ has been eliminated, or (2) that those remaining are accidental to $\mathfrak{S}$; and also that the Plurality of Causes does not here interfere.

Where the Joint Method is employed, we require to know

further that no other operative antecedent was present in the positive set of cases and absent in the negative ones.

Where the Method of Difference is employed, we must be sure that only one circumstance has been added.

Where the Method of Residues is employed, we require the same external evidence as for the Method of Agreement.

Where the Method of Concomitant Variations is employed, we must be further assured, (1) that nothing besides S varies concomitantly with $\mathfrak{S}$; and (2) that whichever (S or $\mathfrak{S}$) is supposed to be the cause of the other, is not in reality the effect.

In each case the real cogency of the argument depends upon the certainty obtainable on these points: obtainable by any external (and especially instrumental) correction of our observations, and by searching analysis of the phenomena observed. The mere statement of the method employed is not by itself a sufficient guarantee: at most it may serve to point out the special direction in which we should look for dangers, and guard against them.

The two main modes of Inductive fallacy known by the time-honoured names of *Inductio per enumerationem simplicem*, and *Post hoc ergo propter hoc*, correspond essentially to failures in guarding against the dangers of the unaided methods of Agreement and Difference respectively. Valid induction often enough *begins* by *simplex enumeratio;* and *post hoc* often sets us on the track of a law: indeed it is difficult to suppose any other beginnings that can be called beginnings of knowledge. But it is when the attempt is made to rest *proof* on these alone, that the characteristic imperfection of all the methods comes to be important. Unaided by special knowledge of the circumstances, they are suggestive guides but uncertain tests.

C.*

THE MOODS OF EXCEPTIVE DISPROOF.

Before tracing in detail the reduction of the fourteen syllogistic moods in I and O to the two formulas given on p. 242 above,† there is a less wide and general view that may be taken for a moment with advantage; and that is, the view of them as reducing a generalisation to absurdity by means of the modes of positive deductive proof. In every valid syllogistic mood there must be at least one positive indication among its premisses, and if such premiss be combined with the contradictory of the thesis (*i.e.* with the positive assertion which such Thesis just denies) we get as a new conclusion either the contradictory or the full contrary of the other premiss. If, then, both premisses be in fact true, the contradictory of the Thesis cannot be true: that is the Thesis itself must be so. Thus in the mood *Baroko*, the Thesis being $S \nrightarrow \breve{S}$, its contradictory is $S \longrightarrow \breve{S}$: combine this with the positive premiss $\breve{S} \longrightarrow M$, and (by *Barbara*) we get the conclusion $S \longrightarrow M$. But this contradicts the remaining premiss of *Baroko*, namely $S \nrightarrow M$, and accordingly one of the premisses in our *Barbara* must be materially false. But the premiss $\breve{S} \longrightarrow M$ is given true: thus the fault is shown to lie in the remaining premiss $S \longrightarrow \breve{S}$: and this being false, our Thesis is necessarily true. It is needless to set out all the forms, but if the reader cares to trace the process in them, he will find that *Bokardo* also employs *Barbara:* that *Festino* and *Disamis* employ *Celarent: Ferio* employs *Cesare: Darii, Felapton,* and *Ferison* employ *Camestres;* while the four moods belonging to the fourth figure employ *Camenes.*

* See p. 241.

† And see formulæ (1) and (11) on p. 355.

In practice, however, any method based on this view of the argument from exception would, I think, be found intricate and unwieldy. The only purpose of mentioning it is in order to admit that on occasion the arguments from sign and from essential difference (and even the almost non-existent form *Camenes*) *may* be thus utilised in Disproof by exception. But since all are also translatable into one or other of the two forms above given, which two are in a sense typical and fundamental; and since, in fact, the amount of translation necessary in order to bring them under the appropriate formula is of the easiest possible description, it seems better worth while to follow the inquiry in this direction.

If we take the fourteen syllogistic moods whose conclusions are in I and O, it will be seen that these two formulas are generalised from them, by omission of the distinctions of quality in M and $\mathfrak{S}$ respectively, by free employment of the law of counter-indication, and by confining attention to the smallest amount of assertion necessary. There is only one, for example, which *exactly* corresponds with our first formula, namely *Baroko*, and only one which exactly corresponds with our second, namely *Bokardo*. All the others may be viewed as varieties of these two.

Thus, in the first place, with M negative instead of positive, we get *Festino;* with M and $\mathfrak{S}$ both negative and with the counter-equivalent of the required non-$\mathfrak{S} \longrightarrow$ non-M (namely M $\longrightarrow \mathfrak{S}$) we get *Darii*. With these differences and also with the counter-equivalent of the required S $+\!\!\rightarrow$ non-M (namely M $+\!\!\rightarrow$ non-S) we get *Datisi;* and if instead of merely M $+\!\!\rightarrow$ non-S in this latter mood we can make the positive assertion M $\longrightarrow$ S, we get *Darapti*. With M negative and with the counter-equivalent of the required $\mathfrak{S} \longrightarrow$ non-M (namely M $\longrightarrow$ non-$\mathfrak{S}$) we get *Ferio;* with the same

differences and also the counter-equivalent of the required S +→ non-M (namely M +→ non-S) we get *Ferison;* and if here we can make the positive assertion M ⟶ S, we get *Felapton.* Finally, with M negative, and only the minor premiss reversed (namely M +→ non-S instead of S +→ non-M) we get *Fresison;* and if this be strengthened into M ⟶ S, we get *Fesapo.*

Similarly, in the second class, with S negative we get *Disamis:* with the same difference and also with the counter-equivalent of the required M +→ non-S (namely S +→ non-M we get *Dimaris;* and if this be strengthened into the positive assertion S ⟶ M, we get *Bramantip.*

A table may be of service to the reader in verifying these details:—

(1)	*Baroko* . . .	S +→ S	for S +→ M	and S ⟶ M	*First formula.*
(2)	*Festino* . . .	Ditto	„ S +→ non-M	„ S ⟶ non-M	
(3)	*Darii* . . .	S +→ non-S	„ S +→ non-M	„ M ⟶ S	
(4)	*Datisi* . . .	Ditto	„ M +→ non-S	„ M ⟶ S	
(5)	*Darapti* . . .	Ditto	„ M ⟶ S	„ M ⟶ S	
(6)	*Ferio* . . .	S +→ S	„ S +→ non-M	„ M ⟶ non-S	
(7)	*Ferison* . . .	Ditto	„ M +→ non-S	„ M ⟶ non-S	
(8)	*Felapton* . .	Ditto	„ M ⟶ S	„ M ⟶ non-S	
(9)	*Fresison* . .	Ditto	„ M +→ non-S	„ S ⟶ non-M	
(10)	*Fesapo* . . .	Ditto	„ M ⟶ S	„ S ⟶ non-M	
(11)	*Bokardo* . . .	Ditto	„ M ⟶ S	„ M +→ S	*Second formula.*
(12)	*Disamis* . . .	S +→ non-S	„ M ⟶ S	„ M +→ non-S	
(13)	*Dimaris* . .	Ditto	„ M ⟶ S	„ S +→ non-M	
(14)	*Bramantip* . .	Ditto	„ M ⟶ S	„ S ⟶ M	

It will be seen that the syllogistic moods corresponding

to our first formula are nearly three times as numerous as those corresponding to the second; but the second is not on this account at all less important, or even less frequently met with in practice. All the syllogistic moods are possible, indeed, but some are no more than possible, and certainly not all these fourteen forms are equally employed. Probably the seven commonest are *Baroko*, *Festino*, *Darii*, *Ferison*, *Datisi*, *Bokardo*, and *Disamis*. Of these the six last form three pairs, differing only in the quality of S; the reason that *Baroko* has no kindred form in I is that for such form the disjunctive non-S $\longrightarrow$ M would have been required, and the disjunctive had no place amongst the moods of the scholastic scheme.

D.*

INVARIABLE SUCCESSION.

In accordance with the plan proposed in this book, I have tried to keep away from all the deeper problems in the theory of causation. This was partly on account of their difficulty, but also because, whatever other elements may be involved in the notion of causal sequence, the element of *invariability* appears strictly sufficient for the purposes here aimed at.

The 'cause' of a thing comes now more and more to mean its 'history.' The assumptions seem more and more justified, that if past events had been at all different this present event or thing would not have been precisely what it is; that if they had been 'essentially' different this would have been essentially different also; and hence, that if the essential part of this event be fixed by definition, to

* See p. 81.

such essential part there corresponds a *part* of the antecedent history, which not happening the event in question (happening there and then) would have been too different to deserve its present name.

But, as noticed elsewhere, the fixing of a definition is never "particularisation to the full." Hence, within the limits allowed by the name, there is room also for difference in the antecedent circumstances (*i.e.* for Plurality of causes), and therefore we are led to read the essentiality only from effect to cause (the indication from cause to effect), and to use the concept 'invariable law' in preference to that of the 'identity' of cause and effect.

In all cases of 'invariable' sequence in which S and $\mathfrak{S}$ are *not* regarded directly as cause and effect, the assertion of invariability is either expressly stated as conditional, or intended as tentative (or 'empirical') only. In the often-quoted case of day and night, for example, experience tells us not only that day always follows night, but also that night follows day, and, further, that day always follows sunrise and night sunset. We thus get a double observation (under the joint-method) in favour of the commonly received explanation of the phenomena, while the supposed assertion, 'night *causes* day,' could only rest upon the method of agreement, and, even in the absence of the other explanation, would be of very uncertain tenure,—being no explanation of more than half the facts observed. It would be an empirical law, entirely unconnected either with wider laws which might explain it, or with other facts which itself might explain; and it would also be open to the obvious criticism that nothing had been shown to prove that the dependence was not exactly the reverse way,—day causing night, as daily exertion (it might be suggested by the poetic mind) causes nightly sleep.

Invariability of succession is then what, in assertions of causation, we always do mean to express, whether we also include Unconditionality (or Efficacy), or keep our assertion close to the facts from which these highly abstract notions take their rise. The sequence of night and day, viewed merely as sequence, and apart from all question of efficacy, is not contradicted by the establishment of the surer sequence "Earth's revolution in sunlight ⟶ day and night alternately," but is merely merged in this, and loses thereby whatever independent value it might otherwise have had as an engine of explanation and prediction. So far as it is for these two purposes only that we need, or use, the notion of Causation, Invariability is sufficient.

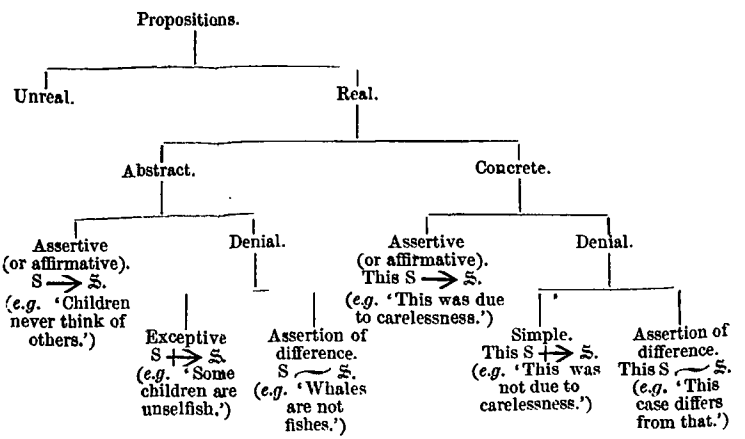
Nor, on the other hand, if we picture causes as liable to 'counteraction,' need the absence of *actual* invariability present a stumbling block. Although, for example, the majority of seeds never actually come to anything, our knowledge of the causes of failure permits us to infer that but for certain obstacles that may be classed and numbered, they would do so. So far only as the definite possibilities of counteraction remain unknown, so far we admit an element of uncertainty in any predictions based on our causal law. In such a case the statement of the law itself is felt to need some further limitation.

E.

TABLE I.*

ABSTRACT AND CONCRETE, AFFIRMATION AND DENIAL.

[→ being the symbol of indication; +→ for exceptive and simple denial of indication; and ~ for the assertion of difference.]


Propositions.
Unreal.
Real.
Abstract.
Concrete.
Assertive (or affirmative). S → S. (e.g. 'Children never think of others.')
Denial.
Exceptive S +→ S. (e.g. 'Some children are unselfish.')
Assertion of difference. S ~ S. (e.g. 'Whales are not fishes.')
Assertive (or affirmative). This S → S. (e.g. 'This was due to carelessness.')
Denial.
Simple. This S +→ S. (e.g. 'This was not due to carelessness.')
Assertion of difference. This S ~ S. (e.g. 'This case differs from that.')

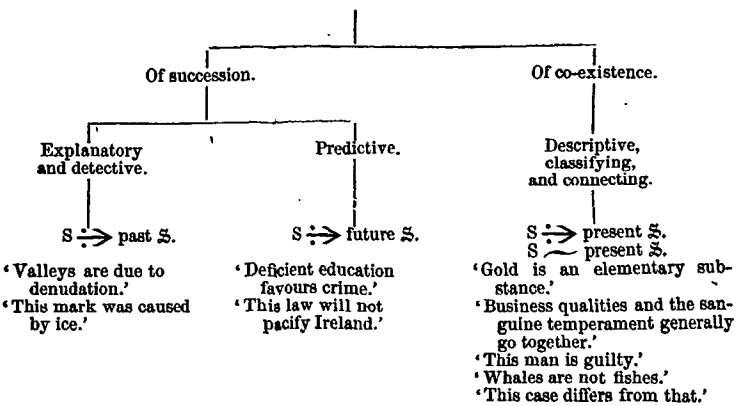
* See pp. 41–78.

TABLE II.*

SUCCESSION AND CO-EXISTENCE.

REAL PROPOSITIONS.

(Whether abstract or concrete, assertive or negative: the symbol $\therefore\!\!\rightarrow$ being used to generalise $\rightarrow$ and $+\!\!\rightarrow$.)

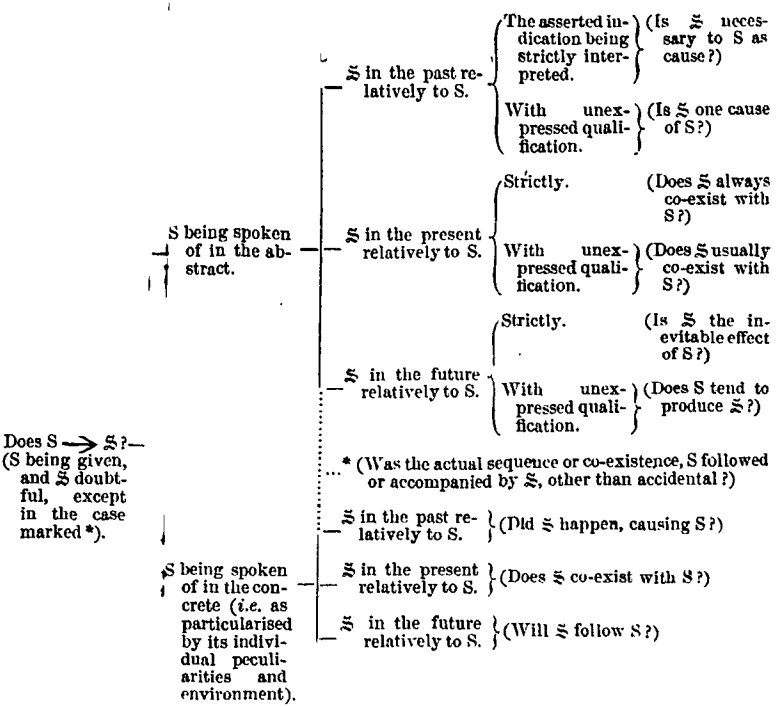

Of succession.
Of co-existence.
Explanatory and detective.
Predictive.
Descriptive, classifying, and connecting.
S ∴→ past S.
S ∴→ future S.
S ∴→ present S.
S ~ present S.
'Valleys are due to denudation.'
'This mark was caused by ice.'
'Deficient education favours crime.'
'This law will not pacify Ireland.'
'Gold is an elementary substance.'
'Business qualities and the sanguine temperament generally go together.'
'This man is guilty.'
'Whales are not fishes.'
'This case differs from that.'

[This table intentionally leaves out of consideration the further distinctions due to 'laws only roughly true:' for these, see Table III.]

* See pp. 79–83.

TABLE III.*

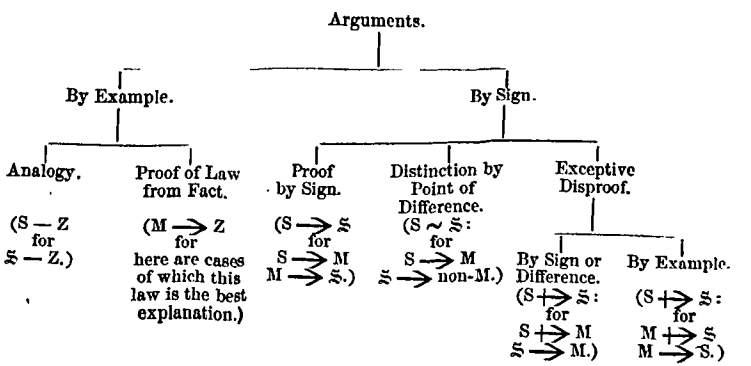
THE QUESTIONS, REGARDING INDICATION, TO ONE OF WHICH EVERY THESIS GIVES THE ANSWER YES OR NO.


Does S → S̄? (S being given, and S̄ doubtful, except in the case marked *).
S being spoken of in the abstract.
S̄ in the past relatively to S.
The asserted indication being strictly interpreted. (Is S̄ necessary to S as cause?)
With unexpressed qualification. (Is S̄ one cause of S?)
S̄ in the present relatively to S.
Strictly. (Does S̄ always co-exist with S?)
With unexpressed qualification. (Does S̄ usually co-exist with S?)
S̄ in the future relatively to S.
Strictly. (Is S̄ the inevitable effect of S?)
With unexpressed qualification. (Does S tend to produce S̄?)
* (Was the actual sequence or co-existence, S followed or accompanied by S̄, other than accidental?)
S being spoken of in the concrete (i.e. as particularised by its individual peculiarities and environment).
S̄ in the past relatively to S. (Did S̄ happen, causing S?)
S̄ in the present relatively to S. (Does S̄ co-exist with S?)
S̄ in the future relatively to S. (Will S̄ follow S?)

* See pp. 41–83.

TABLE IV.*

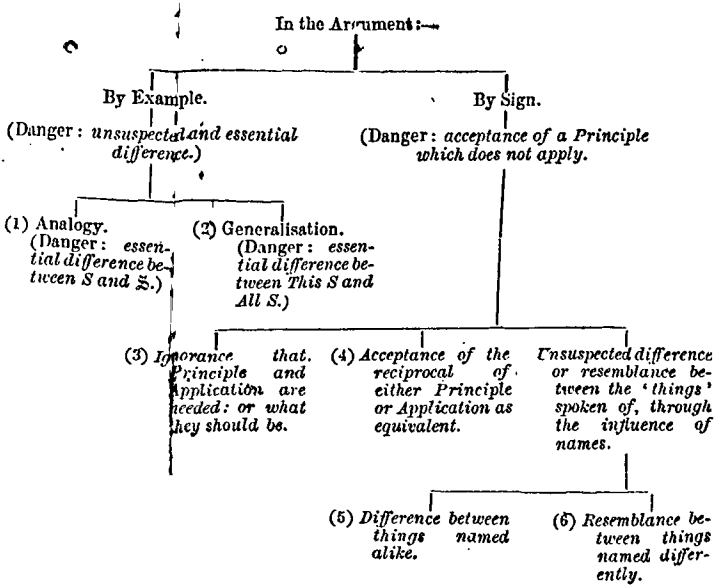
THE TYPES OF ARGUMENT.


Arguments.
By Example.
By Sign.
Analogy.
(S — Z for S — Z.)
Proof of Law from Fact.
(M → Z for here are cases of which this law is the best explanation.)
Proof by Sign.
(S → S̄ for S → M M → S̄.)
Distinction by Point of Difference.
(S ~ S̄: for S → M S̄ → non-M.)
Exceptive Disproof.
By Sign or Difference.
(S ↛ S̄: for S ↛ M S̄ → M.)
By Example.
(S ↛ S̄: for M ↛ S̄ M → S̄.)

* See pp. 224–252.

TABLE V.*

THE DANGERS PECULIAR TO THE SPECIAL TYPES OF ARGUMENT.


In the Argument:—
By Example.
(Danger: *unsuspected and essential difference.*)
By Sign.
(Danger: *acceptance of a Principle which does not apply.*)
(1) Analogy. (Danger: *essential difference between S and S.*)
(2) Generalisation. (Danger: *essential difference between This S and All S.*)
(3) *Ignorance that Principle and Application are needed: or what they should be.*
(4) *Acceptance of the reciprocal of either Principle or Application as equivalent.*
Unsuspected difference or resemblance between the 'things' spoken of, through the influence of names.
(5) *Difference between things named alike.*
(6) *Resemblance between things named differently.*

* See pp. 252–297.

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THE END.

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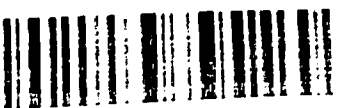
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